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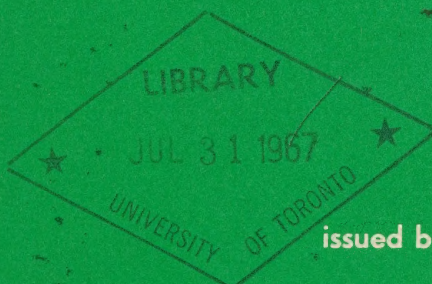
SAFETY MANUAL

for

Government Departments

and

Crown Agencies



issued by

**Accident Prevention and
Compensation Branch**

CANADA DEPARTMENT OF LABOUR

1967



SAFETY MANUAL

for

Government Departments

and

Crown Agencies

CANADA DEPARTMENT OF LABOUR

**Compiled in the Accident Prevention and
Compensation Branch**



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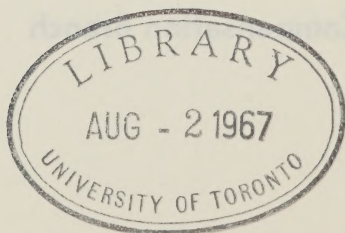


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SUGGESTED READING MATERIAL

National Safety Council Publications

Accident Prevention Manual—Third Edition

National Safety News

N.S.C. Data Sheets

N.S.C. Detail Sheets

N.S.C. Safe Practices Pamphlets

Industrial Supervisor

American Society of Safety Engineers Publications

Engineering for Safety

A.S.S.E. Journal

A.S.S.E. Data Sheets

McGraw-Hill Publishing Co.

Industrial Accident Prevention—H. W. Heinrich

Prentice Hall Inc.

Industrial Safety—Edited by Blake

The Foundation Press Inc.

Industrial Supervision—Froman & Mason

U.S. Department of Labour—Bureau of Labour Standards

Safety Subjects—Bulletin 67

LIBRARIES OF SAFETY MOVING PICTURES AND SOUND SLIDES

Canada Department of Labour	— Information Services Branch
Canadian Film Institute (Agents for National Safety Council Films)	— 142 Sparks Street, Ottawa, Ontario.
Crawley Films Limited (Ask for Directory of Free Sponsored Films)	— 19 Fairmount Avenue, Ottawa, Ontario.
Industrial Accident Prevention Associations (Catalogue on request)	— 90 Harbour Street, Toronto, 1, Ontario.
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INTRODUCTION

This manual has been published for the use of administrative and personnel officials of government departments and crown agencies and does not differ, fundamentally, from the accident prevention plans that have been found so effective in industry.

It is a fact that good safety programs have more than repaid their cost through reduced accident expense and increased efficiency.

Any establishment regardless of size:

- Can set up safety committees.
- Can hold regular group and industrial safety meetings.
- Can set up job safety descriptions.
- Can have safety demonstrations.
- Can use special aids to make things clear.
- Can bring in specialists to help.
- Can use day-to-day reminders.

In the many areas of operational work in government employment corresponding to industry generally, there is the same necessity of periodical inspection and search for work hazards and prompt investigation, report and remedial action when an accident does occur. To avoid, if possible, and to do everything that can be done to prevent recurrence of accidents, is the core of the problem.

This is the first manual of its kind issued for guidance in the protection of government employees in their jobs. It is hoped the manual will prove useful. From the contents, administrative and personnel officers will be able to make up their own forms of instruction, advice and caution for the welfare of the employees of their particular departments, branches, divisions and units.

Work accidents to government employees have been on a rising scale in recent years, with the accompanying personal suffering, dislocation of work schedules and staff arrangements, and, of course, heavy financial cost to the Treasury.

It is sincerely hoped that through accident prevention activities being carried on and planned in government departments and crown agencies and through the Accident Prevention and Compensation Branch of the Canada Department of Labour; as well as in the use of this manual; that the challenge presented may be effectively met.

Chapter I

ACCIDENT PREVENTION

The elements of any accident prevention plan, regardless of the size of the establishment to which it is applied, are embraced in three fundamental requirements. They are the will of both the senior administration officials and the employees to prevent accidents; a safe working environment and the safe performance of employees in that environment. No establishment, large or small, can ignore anyone of these requirements and hope to do a successful job of preventing accidents.

The first consideration, the will to prevent accidents, should extend from the senior administrator to the newest employee. It must be constantly in mind that it is the employee who suffers the injury even though the cost involved by loss of services and medical care is borne by the government. The ultimate goal is the employee's safety: therefore, he should be given an active part in every phase of the program for which his experience and training adapt him. The initial impetus for accident prevention necessarily must come from the top, but active and continual co-operation by the administrator will inevitably result in the co-operation of the employee.

The next consideration is the working environment. Buildings and machines should be properly maintained, dangerous processes should be protected or altered, special personal protective equipment should be provided and every possible physical cause of accidents eliminated.

The provision of a safe working environment is one of the best ways in which to demonstrate a desire for accident-free operation. Employees will not be impressed with the need for safety if unguarded belts, pulleys, gears and machines are permitted to be operated. If there are holes in the floors, lighting is substandard, or defective tools and equipment are supplied, employees cannot be blamed if rules pertaining to good housekeeping or safe use of machines, tools and equipment are neglected.

The third and last consideration is safe performance by the workers. Training men to be safe workers is more difficult than creating a safe

working environment. This problem is attacked in two ways; by careful selection of employees and by training employees in safe methods. The past accident record of an applicant for work should be checked, as a man who has developed a bad record in one position may do so in another.

The safety training of a worker is never finished. It starts with his first interview by the personnel man and continues throughout his working years.

Experienced administrators know the value of the simple, friendly introduction to the new job and new associates. If tensions are eased, instructions are better understood, efficiency will be more assured and the risks from potential hazards reduced. The new employee instructed at the first in safe procedures learns in a few hours things which might become the subject of weeks of "painful unlearning" were he or she not started off in the right way.

More effective than the most carefully planned induction program, however, is the attitude of the supervisors and employees generally in the department to which the new employee is assigned. An induction procedure is both sensible and necessary but it can be a waste of time unless the new employee can see that in actual practice it really works. Every branch has a distinctive atmosphere of its own and every new person who comes to it, quickly absorbs its traits, with all their implications for discipline, for good housekeeping and for safety.

Chapter II

SAFETY COMMITTEES

The general safety committee is the policy forming group in all matters pertaining to safety. Its membership may vary from four to any greater number depending on the size of the establishment, the number of branches and the extent to which it is concentrated. The make-up should include an executive, a supervisor, one representing employees generally and the person, in charge of safety, who acts as secretary. If more than four members are appointed, the balance between supervisors and employees should be maintained. Meetings should be held at regular intervals, usually once a month, and records kept of the proceedings.

The principal duty of this committee is to review the safety program. They must check it against accidents that are occurring, to make certain that the accident prevention efforts of every member of the organization are being properly directed. Other duties of the committee include receiving and reviewing reports of sub-committees, which may be called the supervisor's sub-committee and the inspection sub-committee and acting when necessary on their recommendations.

The supervisor's sub-committee is the working committee that applies the elements of the plan directly to the problem. The membership is composed principally of supervisors but it is always desirable to have several employee representatives in the group. If there is a safety officer, he acts as secretary of this group. The size of the sub-committee will vary according to conditions but it is well to have it as large as possible since it is an invaluable means of training both supervisors and men.

Duties include the review of all accidents and action taken in each case. If the sub-committee should disagree with a supervisor's viewpoint, the corrective action suggested by the majority should be carried out promptly. Reports of the inspection sub-committee are reviewed and action considered necessary is ordered on each recommendation. New safety rules should be discussed and, in addition, each member should be encouraged to contribute practical suggestions that will form the basis of other safety rules or will eliminate unsafe practices or conditions.

All committee members should utilize in their own work, and pass on to other employees, the safety information they have gained at meetings. Supervisors can usually do this through talks with small groups or with individuals in their departments.

The inspection sub-committee consists usually of a supervisor and two employees who make daily, weekly or monthly inspections of buildings and work areas, (frequency depending upon conditions), for the purpose of discovering and having corrected unsafe conditions and practices. Holes in a floor, unguarded machines, unguarded construction openings, poor housekeeping, defective machines or stairs, worn floor coverings, in short, any condition which is likely to cause injury or interruption to work activities, are examples of the physical hazards they should single out and have corrected. The discovery of unsafe practices is highly important, too, since it is well known that unsafe practices are involved in far more accidents than are unsafe conditions.

The membership should be rotated quarterly and the schedule so arranged that not more than one member is changed at a time. This makes it possible to give others the advantage of the excellent training gained through inspection work.

The sub-committee should notify the supervisor in each division before the inspection is started. The supervisor accompanies the member through his area of responsibility so that he can order immediate correction of any unsafe practice or condition noted. Records are kept of each inspection to check against past and future inspections and these are passed on to the supervisor's sub-committee and the safety committee. In establishments where there is a safety expert or adviser he goes with the inspection sub-committee on its tour, while in others he makes a separate check of his own.

Chapter III

TRAINING

The detail involved in securing and maintaining a good standard of safe behavior among the employees of any given establishment is very great. Yet, the basic procedures used are relatively simple. They may in briefest terms be set forth as:

- (a) Safety Education — To develop safety consciousness.
- (b) Safety Training — Developing the workers skill in the use of safe work procedures and practices.
- (c) Safety Supervision — Supervision that teaches, exemplifies and practices first rate safety performance.
- (d) Safety Organization — Devising, maintaining and modifying, as conditions require, a specific set-up to develop teamwork in the furtherance of safety.

Education

Safety educational work to be effective must be much more than an advertising campaign. Promotional programs employing such devices as slogans, stunts, pictures, posters, etc., play a vital part in safety but as is true of all advertising, this type of promotion must be supplemented by intensive individual contact.

Each workman must be stimulated and helped to weave safety into his own day-by-day activities. This means that the hazards of all operations must be analysed and safe procedures established. Safety educational work limited to giving workmen general cautions and safety slogans without telling each one definitely what to do, what not to do and why, are not enough. Few individuals will apply general principles on the wisdom contained in a slogan to their own activities except sporadically and in a limited fashion. Detailed guidance and reasonably continuous pushing is needed.

Training

Training increases one's effectiveness in doing that which education points out the way to do. Training in safety must be given as it is in other arts, by instruction, demonstration and repetition under supervision. Fortunately, most men can quite readily be "sold" on the safety idea enough for them to want to work safely and with relatively little supervision.

The safety training of the employee is a never-ending process. His introduction to safety work should start with his first interview. An explanation of the safety policy should be given by the chief of personnel or the officer first receiving the new employee.

The branch or division head after first finding out what the man knows about the job should thoroughly instruct him in the exact way it is to be performed, stressing safety throughout. The hazards of the work and the reasons for safety rules should be discussed. The new employee should be given every opportunity to ask questions on doubtful points. After a demonstration of the work to be done, the employee might be required to explain the job and then do it to make certain that he or she understands the instruction given. This gives the head or supervisor an opportunity to correct mistakes before bad habits are formed. After this preliminary instruction, the supervisor should check the new worker continuously for safety just as he does for skill in the job.

Supervision

It is evident that quality of supervision will determine effectiveness of training. The supervisor is the keyman in any safety program. He must see that safety is given its full share of attention in all that is done. Basing their attitude on this fact, many administrators have passed the entire responsibility for safety to supervisors, but the job cannot be done that way. Administration must not only require that proper attention be paid to safety by every staff member but it must plan and direct the work, take an active interest in it and take whatever action may be necessary to discover and correct weaknesses.

Organization

The major part of safety work must be done by the regular organization. Safety committees with worker representation have been very valuable, particularly in discovering overlooked hazards and in stimulating

employee interest. Directed by safety-minded administrators, ready to do their full part, such groups can play a large part in eliminating injuries. The entire responsibility for safety, however, cannot be passed on to these committees any more than it can to the supervisors. Only administration can provide the leadership and the executive drive needed. With administration's responsibility thoroughly understood and faithfully met, the committee organization best suited to the needs of the establishment can readily be determined.

Chapter IV

FIRST AID

The Civil Service Health Division of the Department of National Health & Welfare is responsible for the provision of emergency medical and surgical care to government employees (P.C. 3686 dated 24 May, 1945). The discharge of this responsibility in Ottawa is being accomplished by the establishment of Health Units staffed by experienced Nursing Counsellors who are qualified to care for all but a very small percentage of emergency illness and accident. Where no Health Unit or departmental nursing service exists minor cases may be referred to the Health Centre or the nearest Health Unit for attention.

Every government office should equip itself with a suitable type of first aid kit designed for groups of varying size. Outside Ottawa these should be obtained either by local purchase or by some arrangement from headquarters in Ottawa. Minor emergencies and the use of first aid kits should be in the hands of appropriately trained personnel.

Cases of more serious accident, illness, or even sudden death, occasionally occur requiring the services of a physician or hospital. Such occurrence usually occasion a considerable degree of alarm and excitement, and the following comments are offered for the guidance of personnel in such emergencies.

The Civil Service Health Division cannot provide a doctor on call for emergency visits to government offices. Reliance must be placed on the practicing profession, hospitals and ambulance service of the community. Any action taken, therefore, should be designed to enlist these community facilities with the least possible delay.

If the patient has an attending physician or expresses a desire for a specific physician, he should be called and advised of the situation and asked for directions as to further procedure. In emergency, it is necessary to depend on ambulance and hospital service to a great extent.

Failing response by the first physician called an ambulance should immediately be summoned and the patient sent direct to the nearest

hospital. Telephone numbers of hospitals, ambulance services and physicians practicing in the immediate vicinity should be listed for ready reference or may be secured from the classified section of the telephone directory.

In the event the accident happens in Ottawa or vicinity and while waiting for the arrival of the ambulance a telephone call should be placed to the Civil Service Health Division, (Local 2-4841) and a request made to speak to one of the physicians on duty. The situation and what has been done should be explained and he will provide any further advice or instructions necessary. In rare cases, he may consider it advisable to make a personal visit but such visits cannot be made routinely.

If the emergency occurs in a building provided with a Health Unit or departmental nursing service, the nurse in charge should be immediately advised and she will carry out all the procedures outlined above in addition to rendering suitable first-aid.

In cases where the patient is obviously seriously ill but there is no extreme urgency involved, advice may be secured from the Civil Service Health Division as above or the patient may be placed in a taxi or an ambulance and sent to his home or to the hospital, as may seem appropriate. In either case the family physician or physician of the patient's choice should be immediately notified and asked to attend at the patient's home at the earliest possible opportunity.

It is further recommended that in each section or division of a department specific persons be designated as responsible for carrying out any necessary arrangements as above. All staff should be acquainted with the location and telephone number of these persons, who should be chosen for their ability to keep cool and collected and act with intelligence.

Observance of these simple rules will assist materially in safeguarding as completely as may be possible the interests of employees who are taken suddenly ill or meet with serious accident.

Chapter V

REPORTS AND RECORDS

Prompt reporting of accidents is fundamental to efficient safety work. A Department or Agency may keep various kinds of accident records. Information regarding employee injuries occurring at home and otherwise outside of working hours might be recorded separately for inclusion in absenteeism data.

The following basic records are essential but these can be added to as needed.

1. *Employees Report of Accident or Industrial Disease*

See page 22 (Note: This form is for use in Ontario only) Each province has its own accident report form which must be used for injuries occurring in that province. This form is used for reporting accidents to and applying for compensation from the appropriate Compensation Board. It is usually initiated in the first aid room, completed by personnel branch and distributed according to the instructions contained thereon.

2. *Supervisor's Accident Report—See page 24*

initiated by the injured employee's supervisor and contains pertinent information regarding the injury, causes and corrective action. Should be commented on by branch head before going to the safety committee and administration.

3. *First Aid Report—*

by the First Aid attendant or nurse with description of injury and treatment given. Essential as a record in case of aggravation or development from apparent minor hurt.

4. *Monthly Summary of Injuries—See page 26*

a consolidation of the accidents that occurred during the current month. Compiled from the accident reports and contains totals

of accidents by departments (disabling and non-disabling) man-hours worked, frequency rates, cumulative totals, days lost, comparison with previous years and such other information as required by the safety committee and administration.

5. *Accident Cost Report*—

compiled monthly for use by administration. Shows amount expended to cover the cost of each accident.

In addition, a file should be created for each injured employee in which will be placed all documents and information relating to this particular accident.

Other reports and analysis that have proved useful and that can be added to the basic list, as required are:

- (1) Types of accidents.
- (2) Source and cause of accidents.
- (3) Parts of body injured.
- (4) Group of injured persons.

THE FOLLOWING QUESTIONS ARE TO BE ANSWERED ONLY WHERE THE DISABLEMENT DUE TO ACCIDENT OR INDUSTRIAL DISEASE IS LIKELY TO BE MORE THAN FOUR CALENDAR DAYS.

Show separately for each week his GROSS wages (before deductions) and lost time (with wage loss) for the four weeks immediately prior to accident. Include bonuses, tips, etc., but do NOT add or include value of Vacation Pay stamps or Vacation Pay percentage. IF WORKMAN RECEIVED FREE MEALS, OR FULL BOARD (3 MEALS AND BED), IN ADDITION TO WAGES, SHOW NUMBER OF MEALS, OR NUMBER OF DAYS BOARD, IN EACH OF PAY PERIODS REPORTED BELOW: *

13	Period	Wages	Other Allowances*		Lost Time				
			Meals	Board	Holidays Without Pay	Sickness Without Pay	Lack of Work	other	Reason
	from _____ to _____	\$ _____	_____ mls	_____ days	_____ days	_____ days	_____ days	_____ days	_____
	from _____ to _____	\$ _____	_____ mls	_____ days	_____ days	_____ days	_____ days	_____ days	_____
	from _____ to _____	\$ _____	_____ mls	_____ days	_____ days	_____ days	_____ days	_____ days	_____

14	* PLEASE INDICATE THE NORMAL WORKING DAYS BY PLACING X'S IN SPACES, UNDER THE DAYS OF THE WEEK.						
	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	Normal working days a week for the grade of work _____ days				What would have been his normal working hours on day of lie-off from _____ m. to _____ m.		
15	If you have advanced, or will be advancing, the workman anything to cover period of disability, give particulars				Total amount \$ _____		
	Show whether any loss of earnings on day of lie-off				Wages paid day of lie-off \$ _____ Normal pay same day \$ _____		

Signed this _____ day of _____, 19 _____ Employer's Name _____
at _____ Ontario. _____ Signed by _____
Official Title _____

SUPERVISOR'S REPORT OF ACCIDENT TO AN EMPLOYEE

Mill _____ Dept. _____ Section Nos. _____ Case No. _____

Name _____ Date of Injury _____ 19____ Hour _____ M

Address _____ Time Card No. _____ Pres. Rate per Hour \$ _____

Age _____ Male _____ Female _____ Single _____ Married _____ No. Children under 18 years _____

Length of Service with Company _____ At Present Occupation _____

Occupation: Regular _____ When Injured _____

Nature and Extent of Injury _____

Was First Aid Treatment Given? _____ Date _____ Hour _____

Attending Physician _____ Sent to Hospital? _____ Ret. to Work _____

First day of Lost Time _____ Probable period of disablement (days) _____

Statement of Injured _____

INVESTIGATION OF ACCIDENT

When was injury reported to foreman? Date _____ Hour _____ By whom _____

What job was injured employee doing? (including tools, machine, materials used) _____

At what location in mill did accident occur? _____

How long had he been doing this particular type of work? (important) _____

Was this part of his regular duties? _____

How was employee injured? _____

Describe any Unsafe Mechanical or Physical Conditions involved (use reverse side as aid to selection) _____

Describe any Unsafe Act involved (use reverse side as aid to selection) _____

PREVENTIVE ACTION

How can such an accident be guarded against or prevented? _____

What steps have been taken to carry out above recommendations? _____

Report Submitted by (signature) _____ Title _____ Date _____ 19____

Report reviewed by (initials) _____

Dept. Head _____ Date _____ 19____

Gen. Sup't. or _____ Date _____ 19____

Plant Eng'r. _____ Date _____ 19____

Report Approved by (signature) _____ Date _____ 19____

SKETCH OF ACCIDENT

CLASSIFICATION OF ACCIDENT

(To be completed by personnel department)

<u>TYPE</u>	<u>AGENCY</u>	<u>UNSAFE WORKING CONDITION</u>
Struck by	Working Surfaces	Defective Agency
Striking Against	Machines	Hazardous Working Procedure
Caught in, on or between	Materials	Improperly Guarded Agency
Overexertion	Hand Tools	Lack of Personal Safety Equipment
Falls-on same level	Chemicals	Hazardous Arrangement
Slips and Stumbles (not falls)	Vehicles	Poor Housekeeping
Inhalation	Containers	Lack of Necessary Equipment
Contact with extreme Temp.	Conveyors	Other
Falls-to lower levels	Pipes and Piping	<u>UNSAFE ACT</u>
Other	Hoisting Apparatus	Making Safety Devices Inoperative
<u>UNSAFE PERSONAL FACTOR</u>	Boilers & Pressure Vessels	Using Unsafe Equipment
Improper Attitude	Shafts and Cores	Taking Unsafe Position or Posture
Lack of Knowledge or Skill	Steps, Stairs	Failure to Use Safety Equipment
Bodily Defects	Other	Other
Other		

Department

ACCIDENT ANALYSIS

Month

DISABLING

Date	Name	Section	Remarks
<hr/>			

MEDICAL AID ACCIDENTS

Date	Name	Section	Remarks
<hr/>			

Chapter VI

HOUSEKEEPING

Industrial housekeeping has often been summed up as "a place for everything and everything in its place." But there is more to "Housekeeping" than accident prevention; there is fire prevention, eradication of unhealthy conditions (poor ventilation, drafts, fire fighting, etc.,) and control of diseases, conserving of time and space and also improvement of employees morale.

Administration is responsible for the first phase in any housekeeping program as it must provide the plan. The providing of the plan may not be as easy as it sounds as it entails a complete analysis of the physical facilities. Employees soon lose interest in a program that does not provide the means for implementing the policy.

Spasmodic house cleaning is of little or no value. Housekeeping depends on the day to day neatness of working premises.

Cramped working conditions slow production and provide the settings for accidents. A common mistake of administration is to add machines or other production units to already well filled floor space thereby not only increasing the accident hazard but often decreasing the efficiency of the whole room by overcrowding.

The first step is to train each worker to keep his area clean and orderly and then provide containers to catch the scrap. It is also important that the operators of machines in workshops, plants and laboratories be encouraged and in fact required to wipe up oil and other spills at once with rags and absorbents.

The more important items or methods of housekeeping can be grouped under the following headings:

Aisles and Passageways

Aisles and passageways should be well defined and of sufficient width to permit double lanes of traffic. The width is governed by the location and amount of traffic that will be borne.

TO HELP YOU WITH YOUR FIRE PROTECTION PROBLEMS

Following is an excerpt from the Underwriters' Laboratories, Inc., List of Inspected Fire Protection Equipment and Materials, dated January, 1943:

CLASS A FIRES are defined as incipient fires on which the quenching and cooling effect of quantities of water is of first importance, i.e., incipient fires in ordinary combustible materials, such as wood, paper, textiles, rubbish, etc.

CLASS B FIRES are defined as incipient fires on which the blanketing or smothering effect of the extinguishing agent is of first importance, i.e., fires in small quantities of rapidly burning material, such as gasoline, oils, or greases in vats or other open vessels or on floors.

CLASS C FIRES are defined as incipient fires in electrical equipment where the use of non-conducting extinguishing medium is of great importance.



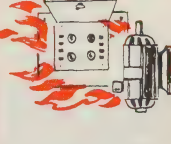


FIRE EXTINGUISHER TYPE	POWDER DRY	CO ₂ CARBON DIOXIDE	PUMP AND NON-FREEZE	SODA-ACID	FOAM	VAPOREZ-ING LIQUID
RATED CAPACITY	20 lbs. 30 lbs.	2½ lbs. 100 lbs.	2½ Gal. 5 Gal.	2½ Gal.	2½ Gal.	1 to 1½ Qts. 1 Gal.
WEIGHT FULLY CHARGED	20 lb. - 37 lbs. 30 lb. - 50 lbs.	2½ lb. - 9 lbs. 5 lb. - 14½ lbs.	2½ gal. 32 lbs. 5 gal. 60 lbs.	2½ Gal. 42 lbs.	2½ Gal. 44 lbs.	1 Qt. - 8 lbs. 1½ Qt. - 10 lbs. 1 Gal. - 30 lbs.
CLASS "A" FIRES Wood, Textile, Rubbish, Etc.	No	No	Yes Excellent	Yes Excellent	Yes Excellent	Yes
CLASS "B" FIRES Oils, Greases, Flammable Liquids, Etc.	Yes Excellent	Yes Excellent	No	No	Yes	Yes
CLASS "C" FIRES Electrical Equip. Industrial, Household	Yes Excellent	Yes Excellent	No	No	No	Yes
CLASS "D" FIRES Automobiles, Trucks, Buses, Boats, etc.	Yes Excellent	Yes Excellent	No	No	Yes	Yes
UNDERWRITERS' RATING	B-1 C-1	5 lb. - B2-C2 15 lb. - B1-C1	A-1	A-1	A1-B1	B2-C2
SUBJECT TO FREEZING	No	No	Yes Unless Treated	Yes	Yes	No up to Minus 48°F
SUBJECT TO CORROSION	No	No	Yes	Yes	Yes	Yes
METHOD OF INSPECTION	Weigh Entire Unit	Weigh Entire Unit	Discharge Contents	Discharge Contents	Discharge Contents	Empty Contents
FREQUENCY OF REFILLS	Only if Used	Only if Used	Only if Empty	Yearly	Yearly	Only if Used
PRINCIPAL EXTINGUISH EFFECT	Snuffing or Blanketing	Snuffing or Blanketing	Cooling and Drenching	Cooling and Drenching	Blanketing and Cooling	Blanketing
EFFECTIVE RANGE	20 to 30 Feet	15 lb. also 8 to 8 feet	45 to 50 Feet	30 to 40 Feet	30 to 40 Feet	20 to 30 Feet
METHOD OF OPERATION	Press Trigger	Press Trigger	Pump	Invert	Invert	Turn Handle and Pump
CHARACTERISTICS OF AGENT USED	Dry Non-Toxic Powder	Dry Non-Toxic Gas	Water	Water Acid Soda	Bubbly Mass	Volatile Toxic Liquid

When an insurance company makes an inspection and specifies what is necessary in the way of fire appliances, the inspector specifies the amount of "units" required. The "unit" has been adopted for convenience in measuring the fire protection afforded by First Aid Fire Appliances to take care of 2500 square feet of floor space.

This classification is shown, opposite the following heading, in the form "A-1", or "A-2", or "A-1, B-1," etc., as the case may be. The letters A, B, or C, designate the class or classes of fires on which the device is suitable. The figures following designate the number of devices required to make one unit of First Aid Hand Fire Protection.

HOW TO SELECT A FIRE EXTINGUISHER

	CARBON DIOXIDE	DRY CHEMICAL	VAPORIZING LIQUID	FOAM	SODA ACID	WATER
CLASS A Paper, wood, excelsior, rubber and general combustible fires requiring cooling and quenching. 	Small Surface Fires Only	Small Surface Fires Only	Small Surface Fires Only	YES Foam clings to vertical surfaces, wets and smothers.	YES Soda-Acid is economical protection quenches and cools.	YES Water is excellent protection; it cools and quenches.
CLASS B Burning liquids (gasoline, paint, oil, grease, etc.) demand a smothering action for quick extinguishment. 	YES Has no ill effects on food and leaves no residue.	YES Chemical smothers fires	YES Vaporizing liquid is converted into a gas—which smothers the fire.	YES Heavy foam blanket on surface of burning liquids smothers.	NO Basic water content will spread liquid fires.	NO Water will spread fire, not put it out.
CLASS C Live electrical fires (motors, switches, appliances, etc.). A non-conducting extinguishing agent must be used. 	YES Carbon dioxide is non-conductor; will not damage costly electrical equipment or leave residue.	YES Dry chemical is non-conductor of electricity.	YES Liquid is non-conductor and will not damage equipment.	NO Foam is a conductor and should not be used on electrical equipment.	NO Should not be used on live electrical equipment; basic water content will conduct.	NO Water, a conductor should not be used on live electrical conductor.
SUBJECT TO FREEZING	No	No	No	Yes	Yes	Yes, unless chemical is added.
EXTINGUISHING AGENT	Carbon Dioxide	Dry Chemical	Heavy vapor formed from liquid by heat.	Foam Bubbles	Soda Water Solution	Water
RANGE	5-10 feet	10-25 feet	20-30 feet	25-35 feet	30-40 feet	35-50 feet
EFFECT ON FIRE	Smothers and Cools	Smothers and Cools	Smothers and Cools	Smothers and Cools	Cools and Quenches	Cools and Quenches

Materials should not be permitted to project into the aisles nor should the aisles be used for storage purposes either temporary or permanent.

Elevators

Proper operation and maintenance of elevator equipment are essential in housekeeping programs. Elevators should be equipped with interlocking devices which will prevent them from operating while the gates are open.

Fire Fighting Equipment

An adequate supply of fire extinguishers should be provided and they should be installed in carefully selected, easily accessible places.

The construction, purpose and method of operation of each type of extinguisher should be taught by explanation and discussion and by permitting employees to handle the equipment.

Fire fighting equipment should be inspected frequently. The frequency of fire drills will be determined by the physical condition of the building and surroundings.

Fire fighting equipment should never be blocked off or hidden by stored materials.

Flooring

Floors should be kept free from holes and obstructions especially where the floors form part of aisles or walking places.

In areas, where wet processes are carried on, floors should be given special consideration for proper grading and drainage. Rough paint or safety-non-slip cleats are particularly useful in such areas in eliminating slipping hazards.

Lighting

Poorly illuminated rooms are breeding places for indifferent housekeeping. All places of work including work benches, aisles, passageways and stairways should be suitably lighted and free from shadows.

All unnecessary hangings on walls should be removed and the walls kept clean and freshly painted with a light coloured and highly reflective paint.

Windows should be kept clean with a regular schedule of washing so that natural light will be used to its best advantage.

Painting

Freshly painted walls and equipment encourage the employees to be clean and orderly in their work and personal habits. The use of the safety colour code of painting serves two purposes, first, it brightens up the room, particularly the dark corners and, second, assures the maximum benefit from natural lighting.

Sanitation is a natural companion of safety and housekeeping. Many industrial firms now provide shower rooms in addition to locker and wash-rooms. Lockers should be ventilated and the workers cautioned against storing oily clothing or waste material in them. Whatever the accommodation provided for employees it should be kept clean and orderly. Someone should be responsible for seeing to this.

Stairways

Stairways should be kept clear of all materials and should be well lighted.

As tripping and falling accidents are possible in these locations hand rails should be constructed. The addition of non-slip materials to the treads is also helpful in preventing accidents.

Storage

The improper piling and storage of materials is a major cause of poor housekeeping. Piles of materials should be located in such a way that they do not form tripping hazards. Piles should allow sufficient clearance between the top level and the sprinkler and light systems. Tools and equipment should be returned to stores or place of storage and not left lying around when they have served their purpose.

Such materials as oils, grease, acids and toxic substances should be handled and stored only under established procedures and all spillage cleaned up immediately.

Chapter VII

GUARDING

The elimination and physical guarding of hazards in the shops and laboratories is a prime requisite of any safety program. It also indicates, to the workers, administration's desire to provide safe working conditions.

Guards

Guards are usually constructed of wood, sheet metal, cast metal, expanded metals, perforated metal and woven wire. Other materials such as fibre board, transparent plastics, etc., are frequently used.

The requirements of a good guard may be summarized as follows:

- (a) The guard must afford maximum protection including protection in the event of the failure of the part guarded.
- (b) It must not interfere with the efficient operation of the machine.
- (c) It must be so designed and constructed that the enclosed parts are easily and safely accessible for lubrication, repairs or routine changes.
- (d) It must be durable; strong enough to withstand ordinary wear and also abuse.
- (e) The guard should be attached to the machine and not to the floor; if attached to the floor, use a connection which will interfere as little as possible.

Material

The framework of power transmission apparatus guards is usually made from angle iron, strap iron, iron pipe, bar stock, or wood. The filler is usually constructed of sheet, perforated or expanded metal, woven wire, fiber board, plywood, plastic or shatterproof glass.

Materials used in guards should be free from burrs and sharp edges. Wire mesh should be of a type in which the wires are fastened at each cross point by welding, soldering, or galvanizing, except in the case of diamond or square mesh made of 14 gauge wire $\frac{3}{4}$ -inch mesh or heavier.

If the guard is to be rigidly secured to some part of the machinery or building structure, the frame should be made of angle iron 1-inch by $\frac{1}{8}$ -inch, metal pipe with $\frac{3}{4}$ -inch inside diameter or metal construction of equivalent strength. The guards should be braced at 3 foot intervals to some fixed part of the machinery or building structure.

If the guard is to be secured to the floor or to a working platform without other support or bracing, the frame should be made of $1\frac{1}{2}$ -inch by $\frac{1}{8}$ -inch angle iron, metal pipe with $1\frac{1}{2}$ -inch inside diameter or metal construction of equivalent strength.

Metal is preferable to wood except for guards to be used where chemicals or fumes would tend to deteriorate or corrode metal. In such instances, corrosion resistant metals or wood guards are recommended. The disadvantages of wood guards are that they increase the fire hazard, are more expensive in upkeep and will not withstand as much wear and impact as metal guards. Recent developments in waterproof plywoods and adhesives have permitted the use of plywood guards which do not splinter nor come apart.

The material and construction of wood guards should conform to the following specifications:

- (a) The wood should be sound, tough and free from loose knots.
- (b) Guards should be made of planed lumber not less than 1-inch by 4-inch board measure, with the edges and corners rounded off.
- (c) Dowel pins, screws or bolts rather than nails, should be used as fastenings for wood guards; if the wood dries, nails tend to become loose and weaken the guard or cause injury.
- (d) Material for the framework and filler material should have the strength and rigidity specified for metal guards.

Mechanical Equipment Guards

The guarding of shafts, belts, pulleys, gears, starting and stopping devices, and other moving parts of equipment will do much to prevent injury to workers. But it is also important that only authorized persons make repairs or do maintenance work on this equipment and that those working about the equipment wear suitable clothing and follow approved

safe practices. Many injuries and considerable damage to property have occurred when unauthorized persons or those unfamiliar with the equipment have attempted to do repairs or maintenance work.

Frequent and regular inspections should be made of all power transmission apparatus and its appurtenances to make sure that they are in proper working condition and so guarded that no one will be injured by accidental contact.

As a general rule, any shaft, belt, pulley, gear, coupling, etc., which is within seven feet or less of the floor or working platform, except runways used exclusively for oiling or making adjustments, should be substantially encased with stationary guards. Shaft ends which project beyond a bearing or hub should be cut off flush or guarded by a non-rotating cap or safety sleeve. Unused keyways should be filled up or covered.

Conveyor Guards

The motive power equipment of conveyors wherever located within seven feet of the floor or working level should be effectively guarded. They should also, be provided with starting and stopping devices located at convenient points particularly at loading and unloading platforms and at the drive and take up ends.

There is often a tendency on the part of some workmen to ride conveyors. Such a practice is decidedly dangerous and should be prohibited. Guard rails placed across conveyors at frequent intervals serve to prevent this practice; warning signs should be posted on the rails.

Wherever conveyors cross over passageways, aisleways or places where employees are at work or must pass beneath them, screens should be provided to catch materials which might fall from the conveyors. At points where conveyors pass from one floor to another and are not entirely enclosed, the opening through the floor should be protected by railings and toeboards.

Workers should be forbidden to cross over exposed conveyors except at regular crossover points. At all such crossover points there should be an elevated bridge equipped with handrails or a tunnel so that there is no danger of any person coming in contact with the conveying equipment.

Elevator Guards

Hoistway windows, to a height of seven floors above grade and less than three floors above an adjacent roof, should be fitted on the outside with vertical metal bars not less than $\frac{5}{8}$ -inch in diameter and spaced not more than 10 inches apart; this serves to warn firemen and others not to enter.

Every landing opening should be equipped with doors or gates and such doors or gates should be equipped with interlocks or electric contacts that prevent the use of the car while they are open.

Every passenger elevator car should be fully enclosed—sides and top. Every freight elevator car should be enclosed on all sides, except for necessary entrance opening to a height of at least six feet. Freight elevator cars should also be provided with solid or openwork top covers. These covers can be hinged to permit the handling of lengthy materials.

Hoistway surfaces, opposite car entrances, should be free from projections. Where a sheer point exists, the underside of the projection should be guarded by a substantial bevel guard which tends to push any protruding article back into the car.

Ladder Guards

Fixed ladders 20 feet or more in length should be provided with a cage or basket guard. The cage should extend from the top of the ladder to a point 7 feet from the base, with the bottom of the cage flared 4-inches. The inside should be clear of all projections, not less than 24 inches nor more than 28 inches from the face of the ladder and should be not less than 24-inches wide.

Rail Guards

Requirements for standard railings are:

(a) Railing should be 42 inches in height with a mid-rail between the top and the floor.

(b) Posts should be not more than eight feet apart. They are to be permanent and should be substantial, smooth and free from protruding nails, bolts and splinters. If made of pipe, they should be $1\frac{1}{4}$ -inch inside diameter or larger. If made of metal shapes or bars, their section should be equal in strength to that of $1\frac{1}{2}$ -inch by $1\frac{1}{2}$ inch by $\frac{3}{16}$ -inch angle iron. If made of wood, the posts should be 2 inches by 4 inches or larger.

(c) The upper rail, if of wood, should be 2 inches by 4 inches or two strips 1-inch by 4-inches, one at the top and one at the side of the posts. The mid-rail, if of wood, may be 1-inch by 4-inches or more. The rails (metal shapes, metal bars or wood) should be attached on that side of the posts which gives the best protection and support. Where panels are fitted with expanded metal or wire mesh the middle rails may be omitted.

(d) Toe guards, made of 1-inch material, should be added wherever there is the danger of objects being kicked or knocked through the railing guard to a lower level.

Scaffolds

Many factors involved in the safe design and use of scaffolds are common to all types. Others are specific to certain types. Requirements for general application are as follows:

(a) Every scaffold should be designed to carry at least four times the anticipated loading.

(b) The erection, alteration and removal of scaffolds should be done only under the supervision of men who are thoroughly experienced in this work and have sufficient knowledge of structural design to ensure application of the proper factors of safety.

(c) Wood used for scaffold structures should be carefully inspected before use. Pieces accepted should be reasonably straight grained and free from shakes and large, loose or dead knots or other defects which may reduce the strength of the pieces. Wood, so selected, should be stored where protected from rain and sunshine.

(d) Scaffolding should be of substantial construction and, as the use of barrels, boxes, loose tile blocks or other unstable objects as supports for working platforms have caused many accidents, their use should not be permitted.

(e) Standard railings should be considered an essential part of every scaffold whose platform is of sufficient height that falls may cause injuries. The platform edges of every scaffold should be equipped with toe boards to eliminate the hazard of tools or other objects falling from the platform.

General Guarding

Stairways and elevated walkways should be equipped with handrails and toe boards.

Windows immediately adjacent to stairways or ramps should be covered with heavy wire screens.

Doors that open out, onto or into, shafts, etc., should be kept locked and provided with warning signs. As an extra precaution they should be provided with additional rail or screen barriers.

Open pits such as motor pits, sumps, etc., should be railed off with standard railings.

Steep ramps should be surfaced with non-slip cleats or paint.

Lights should be provided in dark corners or areas.

Projections into aisleways or walkways should be railed off or painted with some contrasting colour.

Changes in floor level should be clearly defined.

Power saws (including band saws), shapers, drills, etc., should have the point of operation guarded. Most of this equipment, now, has guards installed as an integral part of the machine by the manufacturer but, for the older machines already installed and not so equipped, there are available suitable guards at most safety equipment companies.

Temporary Guards

Temporary guards are sometimes necessary in the relocating of machinery or installing and testing of new equipment. Such temporary guards should give the same protection and, except for appearance, should conform as closely as possible in strength, rigidity and clearances to the specifications for permanent guards.

Chapter VIII

GENERAL SAFETY RULES

Safety rules are published to govern specific unsafe practices or known hazards that exist in establishments. No two establishments can be covered by the same set of rules as the circumstances surrounding the working conditions in various units are usually different. The following general safety rules are listed as a guide and not as a final or complete list.

1. Stay out of areas which have no connection with your duties.
2. Report all accidents and "near accidents" to your supervisor.
3. Do not strike any object under steam or air pressure.
4. Oily rags must not be left lying around, nor must they be put in tool boxes. Put them in the proper metal containers, and do not throw them into waste-paper receptacles.
5. Report all defective guards and railings to your supervisor.
6. Do not use power tools or power-driven equipment unless authorized to do so.
7. Walk, do not run, up and down stairs. Use the hand rail and keep to the right.
8. Do not ride on conveyors of any kind, nor climb across them while they are running. Take the time to cross them at the proper place.
9. Unless your eyes are properly protected, do not enter the welding shop while arc-welding is in process.
10. When working overhead, place "DANGER" sign to warn anyone against passing underneath.
11. Do not startle or otherwise distract other employees while they are working, particularly around machinery in motion.

12. Gasoline must not be used to clean tools, machine parts, clothing or parts of the body.
13. Compressed air must not be used to dust off the hair, clothing or workbench, nor is it to be used as a plaything. A number of employees have died in great pain when compressed air entered their bodies.
14. Keep aisles clear of material, trucks, truck handles, and of all objects which might cause someone to trip and fall.
15. Do not ride on hand or power trucks.
16. Do not indulge in horseplay.
17. Boards with nails protruding from them must not be left lying around. If you see any, remove the nails or bend them over, whether or not you left the boards there in the first place.
18. Do not walk or stand under suspended loads.
19. Report all injuries, no matter how small, to first aid for immediate attention.
20. In lifting a heavy object, squat down by bending your knees and then get a grip on it—don't stoop over with your knees stiff to lift it. Lift with your thigh and leg muscles, and not with your back. If you find that something is too heavy to move alone without risking bodily injury, get someone to help you, or use a hoist or chain-fall.
21. Rope off hatchways, pits, manholes and other floor openings when their covers have been removed.
22. Do not try to remove a foreign body from your eye, nor from that of a fellow worker.
23. If you spill oil or any other liquid on the floor which might cause someone to slip and fall, wipe it up.
24. After finishing any repair work, see that all debris is picked up and return all tools to their proper places.
25. When carrying long heavy objects, such as a pipe, with a fellow-worker, place it on the same shoulder that he is using and keep in step. Warn him when you are about to drop or lower your end of it.

26. Do not stand inside a coil of rope while it is being unwound.
27. Never work under a load supported solely by a jack.
28. Do not carry pipe by placing your hand inside the end of it as the edge is often sharp and may cause a severe laceration .
29. When carrying bulky objects, hold them in such a way that you can see where you are going, particularly when descending stairs.
30. Tools or materials must not be left on scaffolds, whence they might fall and injure someone.
31. If necessary to climb up above floor level, climb down again—do not jump down.
32. When reaching into a box with a hinged cover, make sure that the cover is firmly held open so that it will not fall on you.
33. If the area in which you work is not sufficiently lighted, install an extension cord, if possible, or inform your supervisor.
34. Bicycles must not be ridden in any part of the establishment.
35. Do not rush the Time Clock at lunch or quitting time.
36. Intoxicating liquors must not be brought into the establishment, nor can any employee be admitted to work who is under the influence of liquor.
37. Smoke only in areas indicated for this purpose.
38. Do not sit on guards, handrails, or in other unsafe places.
39. Remain in your own department unless sent elsewhere on company business. Obey "DANGER"—"KEEP OUT" signs.
40. Passageways leading to fire escapes must not be blocked, and ready access to all fire extinguishers must be maintained. Sprinkler heads must not be made ineffective by piled materials.
41. Sleeping on the job is forbidden.
42. Drink water only at the drinking fountains.
43. Throw rubbish in the receptacles so provided.
44. Notify the proper person if you cannot come to work at the appointed time.

45. Take salt tablets frequently during the summer or when working in overheated locations in the establishment.
46. Do not run or crowd on or near stairways. Whenever going up or downstairs, WALK and use the hand rail provided. Never walk on stairs with hands in pockets. Help prevent accidents by picking up loose objects on the stairs and disposing of them.
47. Extension cords must be in good condition and trouble-lamp bulbs must be provided with a guard. Thread extension cords so that they do not provide tripping hazards. If necessary to lay an extension cord across a passageway, place a board on either side of it.
48. Sweep up broken glass with a broom—do not pick it up with your bare hands.

Chapter IX

CLOTHING

1. Loose clothing or gloves, unfastened neckties, finger rings, watch-chains, or caps with celluloid visors must not be worn. Trouser cuffs should be cut off. Rolled sleeves are hazardous.

2. Remove gasoline or kerosene-soaked clothing immediately before it causes a skin inflammation.

3. Wear suitable protective clothing when working around hot steam pipes, or other hot material or equipment.

4. Head protection, in the form of a hard hat, must be worn by employees working wherever there is danger from falling objects.

5. Wear eye protection when grinding on emery wheels, using air-driven tools, chipping concrete or metal, pouring metal, using compressed air for cleaning, while doing overhead spray painting, or when doing any other work where there is the danger of foreign matter being blown or thrown into the eyes.

6. Wear eye and respiratory protection when unloading or handling caustics, or other raw materials which might cause injury to eyes or lungs.

7. Wear an acid shield, rubber gloves, and a rubber apron or acid proof clothing when unloading or handling acid or other chemically active liquids.

8. Wear rubber boots and rubber gloves when slacking lime.

9. Gloves should be worn while handling materials which might injure the hands, but they must not be worn around machinery in motion.

10. Safety shoes must be worn for any work where a heavy object might fall on or strike the feet.

Chapter X

MACHINERY

1. A rag must not be used to clean or polish machinery in motion.
2. A screw conveyor must not be started until all covers are in place.
3. If necessary to apply belt-dressing to a moving belt, do so on the off-running side only. If liquid dressing is used, it should be warmed until it flows freely. It must be applied with a brush—not with rags or waste.
4. No machine must be operated unless all guards and safety devices are in place and functioning properly.
5. Machinery must not be cleaned, repaired, unblocked, or adjusted unless the power is shut off and the switch properly tagged or locked.
6. When stopping a machine to adjust or repair it, wait until all motion ceases before beginning to work on it.
7. Foreign objects must not be removed from moving belts or pulleys by using your hands or even a stick.
8. Moving belts must not be shifted by hand, nor with a stick or metal bar.
9. If it is necessary to remove a guard for lubrication, repairs, or other work, replace it before leaving the job.
10. Do not operate, adjust, lubricate or repair any machinery or equipment unless you have been specifically authorized to do so.
11. Before beginning your work on any machine, get specific instructions from your supervisor.
12. Never use the hands or body as a brake to stop a moving machine, even if the power has been shut off.
13. When oiling, do not reach over shafting or pulleys or between belts, and do not climb over or between them. Use a can with a spout sufficiently long to reach the bearings safely.
14. Do not try to put on a belt while the shafting is running—stop it first and use a rope. Do not try to hold onto the rope after the belt has slipped onto the shaft—let it go.

Chapter XI

EQUIPMENT

(Manually Operated)

Hand Truck (Two Wheeled)

1. A hand truck should be inspected before use. The axles should be greased, the wheels not cracked or broken, and the handles in good condition.
2. Never replace a cotter pin in an axle with a nail.
3. A truck should not be left standing in an aisle nor where it can fall over and obstruct a passageway.
4. Stay behind the truck when going down a ramp with it. Watch your hands when going through doorways.

Hoisting Apparatus

1. Find out the approximate weight of the load to be lifted and do not overload the equipment. Inspect beam clamps, slings, chain-falls, ropes, etc., before using them.
2. Place the hooks and slings securely, and pad the chain or rope where it bends over a sharp corner.
3. Do not cross a chain, twist it, or put a kink in it. Do not shorten a chain by knotting or bolting.
4. Keep your hands from between cables and pulleys, hooks or slings and the load, or other places where they may be caught when the load is lifted.
5. Keep out from under suspended loads.

Hoses (Air)

1. See that the hose is sound and that the couplings are secure, with no sharp metal points projecting.

2. Before turning on the air, close the control valve in the portable pneumatic tool you are going to use. If you wish to change the tool turn off the air at the control valve instead of kinking the hose to stop the air.

3. The air hose must not be used to dust off the hair or clothing. Do not point it at anyone, and see that no one nearby is in line with the flow of air before you turn it on.

4. Wear suitable goggles or a respirator if necessary.

Hoses (Steam)

In using a steam hose,

1. Grasp it firmly close to the nozzle so that it does not get away from you and whip around to strike you or a fellow-worker.

2. Point the nozzle toward the floor before you open the valve. Never open the valve when the nozzle is lying free on the floor.

3. If a mixture of steam and water is desired, turn the water on first, then the steam. In turning them off, first shut off the steam, then the water.

4. Wear rubber boots and an apron reaching below the boot tops.

Ladders (Straight Ladders)

1. Use only ladders in good condition, and use one which is long enough for the job you have to do.

2. Place the ladder on a solid surface. Do not place it on top of boxes or other makeshifts to increase its height.

3. Estimate the length of the ladder and place the feet about one-quarter of that distance from the foot of the surface against which it leans.

4. If the ladder is placed before a doorway, lock the door or have someone guard it. Protect the ladder base from traffic, if necessary.

5. Face the ladder and hold on with both hands while climbing up or down. Clean mud or grease from your shoes before climbing it.

6. Carry small blunt tools in suitable pockets. Large and sharp tools, materials, etc., should be hauled up by means of a bucket and hand-line and not carried in one hand while climbing up or down a ladder.

7. When working from a ladder, work facing it, and hold on with one hand.

8. Do not reach out too far from a ladder—climb down and move it so that you can reach the work safely.

9. When leaning a ladder against a window, nail a board across the top of the ladder which will bear on the wall frame.

10. When leaning a ladder against a vertical pipe, round column, or other curved object, use a ladder with a piece of rope inserted in it in place of the top rung.

11. Ladders with spikes are for use on wooden or dirt floors—not for cement floors. Do not reverse a ladder with spikes so that they are on top—get a ladder suitable to the floor on which you wish to place it. Use a ladder with safety feet, or tie both the bottom and the top of the ladder securely before using it.

12. When a ladder is used to reach a platform, the ladder should extend at least 42" above the level of the platform.

13. Do not use a ladder as a horizontal member of a scaffold.

14. When carrying a ladder,

(a) If ladder is light enough for you to handle it alone, carry it with the safety feet to the rear and the front end elevated so it will be above the head of anyone in front of you.

(b) If the ceiling is low, carry the ladder at your side with safety feet to the rear and grasping it by the rail. Be extra careful when approaching doorways and going around corners.

Ladders (Stepladders)

Most of the rules for the use of straight ladders apply also to stepladders, but these below apply particularly to them.

1. Open the stepladder far enough so that the spreader locks itself in the open position. Do not use stepladders with non-rigid spreaders, such as those made of rope or chain.

2. Do not work from any step higher than the second one from the top. When you come down, bring your tools with you unless the stepladder is equipped with tool holders.

Scaffolds (Swinging)

1. Do not overload a swinging scaffold. Use suitable knots and be sure that the ropes are firmly fastened. Tie the fall lines to the scaffold itself, and not to any part of the building.

2. The scaffold should be lashed securely to some permanent support in case of a sudden blow. It should not be used in stormy weather. Loose objects should be removed from the scaffold at mealtimes and when stopping work for the day.

3. Do not jump on or off swinging scaffolds, nor try to reach it by sliding down or climbing the ropes.

4. Keep acid or caustic solutions from coming in contact with the ropes.

5. When painting or when the area under the scaffold is a passage, attach a tarpaulin to the under-side of the scaffold.

Wheelbarrows

1. Before using a wheelbarrow, see that the handles are not defective, the wheel is firmly set, and that the legs are solid. The axle bearings should be well oiled.

2. Balance the load and place it well forward in the wheelbarrow. Lift mostly with your legs and keep the back as straight as possible. Do not run while pushing a wheelbarrow, and watch for insufficient clearances at doorways.

3. When transporting a heavy load, plan to get clear of the handles if it should tip over.

4. Check on the solidity of plank runways and platforms across openings.

5. When finished with the wheelbarrow, store it so that it will not tip over in a place where people will run into it.

Chapter XII

EQUIPMENT

(Power)

Concrete Mixers

1. Set the mixer level to prevent it tipping over, and block the wheels if necessary. Place the control in neutral before starting the engine, and run the engine for over five minutes before you engage the clutch.

2. Be sure that everyone is in the clear before you move the skip up or down. Stay away from the drum opening when the mixer is running. If there is much cement dust, wear tight-fitting clothes and a respirator.

3. When leaving the mixer, land the skip, set the brakes, and turn the switches off.

Cranes and Power Hoists

1. Only those so authorized may operate power hoisting equipment.

2. Test the hoist brakes and controls before starting your shift. If handling an unusually heavy load, test the brakes first by a short lift to see that you have control.

3. Lift a load smoothly, and avoid jerking it into the air. If it does not ride properly, lower it and have the sling readjusted.

4. Take your signals only from the one responsible for giving them. See that everyone is clear and avoid carrying the load over employees' heads. Do not allow anyone to ride on the load or on the hook.

5. Do not attempt to put the hoist trolleys back onto the power line unless the power has been shut off and the switch properly tagged.

Electric Trucks

(Fork Lift)

1. Only those so authorized may use electric trucks.

2. Inspect the truck before using it. Start and stop it slowly and do not overload it.

3. Put the fork under the center of the weight of the load. Tilt it against the back-rest before moving. When piling materials, return the load to a vertical position before lowering it.

4. Face the way you are travelling and keep the load just clear of the floor. Back down ramps or inclines to avoid spills and look out for uneven spots in the floor. Do not allow anyone to ride on any part of the truck.

Electric Trucks

(Scoop)

1. Only those so authorized may use electric trucks.

2. Test the brakes, controls and scoop cables before starting to work.

3. Drive at a safe speed and watch out at doorways and intersections. Use your horn, but do not count on it alone—keep your eyes open all the time. Face the direction in which you are moving. Do not carry passengers.

4. When leaving the truck, shut off the power and remove the switch or control handle. Pull out the connecting plug if you are leaving the truck for more than a few minutes.

Motor Trucks

1. Motor truck drivers shall not allow any employees to ride in the trucks either in the cab or on the body unless in the performance of their work as instructed by their foreman.

2. Truck drivers are absolutely forbidden to give rides in their trucks to any persons, employees or otherwise, either on the premises or during outside trips.

3. No employees shall be allowed to ride on the body of the truck unless absolutely necessary and instructed to do so by the foreman.

4. If necessary for any employees to ride on the body of the truck, they shall not be allowed to stand.

5. Further, if necessary for employees to ride on the body of the truck they shall not do so unless there is positive protection provided both by side boards and tail board or other adequate barrier protection on both sides and rear of the body.

6. Motor trucks on the premises shall proceed in a forward motion rather than in reverse where possible.

7. At all times motor trucks on the premises shall proceed at a very slow speed. Ten miles an hour is a suggested speed limit.

8. Trucks approaching a blind corner or intersection shall come to a full stop and sound a warning before proceeding. Signs should be erected requiring this, and the practice enforced in particularly bad spots.

9. Trucks shall come to a full stop before proceeding across any railroad crossing.

10. Whenever necessary for any truck to proceed in reverse through any of the roads or approaches to platforms, a lookout shall be posted at the rear of the truck in full view of the driver to give any necessary warning either to the driver himself or any persons who might be in danger.

Chapter XIII

TOOLS

(Hand Tools)

(General)

1. Use only tools in good condition. Do not use those with loose or split handles, cold chisels with mushroomed heads, wrenches with loose jaws, or tools with other defects.

2. Select the proper tool for the job you have to do and use it for that job only. Do not use a wrench as a hammer, for example.

3. Sharp tools are safer than dull ones. Keep all keen-edged blades sharp. Store them safely when not in use. Guard them with a sheath when carrying them.

4. Do not strike any object under steam or air pressure, nor tighten a nut, bolt, or threaded pipe on lines or tanks which are under pressure.

5. If the file you intend to use has an unprotected tong, get a handle for it.

6. Axe handles must be kept free of oil, ice, etc., to prevent them from slipping while in use.

7. When using an axe see how much space is available in which to swing the tool, lest it strike something, be deflected, and injure you.

8. When using a screwdriver, use one that fits the screw head and start the screw by making a hole or tapping it with a hammer. Place the work on a flat surface—do not hold it in your hand.

9. When digging a ditch, cut the sides back at a safe angle or shore them up.

Hammers

1. When using a hammer see how much space is available in which to swing the tool, lest it strike something, be deflected, and injure you.

2. Hammer handles must be kept free of oil, ice, etc., to prevent them from slipping while in use.

3. When driving a nail, start it with a few light taps of the hammer, then a hard glancing blow will not send it flying through the air. In starting the nail, hold it just under the head.

4. When using a hammer or clawbar to extract nails or when using any object as a lever or pry, brace yourself firmly so that you will not fall or collide with something if the object to be moved suddenly releases or changes its position. After the nail is partly drawn, place a block of wood under the hammer to increase leverage and reduce strain.

Picks

1. In swinging a pick, spread your feet apart, set them firmly, and take a good grip on the handle. See that the handle is free of ice. Do not swing the pick in line with your feet or legs. Watch out for glancing blows when digging in rocky ground.

2. Do not use the pick as a hammer. When laying it aside or storing it, put it where no one will trip over it and where it cannot fall.

Wrenches

1. When using a wrench, place it on the nut in such a position that the pull on the handle tends to force the jaws further onto the nut. Brace yourself so that you will not fall if the wrench slips or the nut releases suddenly.

2. If necessary to push on a wrench in a tight place where clearance is small, push with the palm of your hand with your fingers out in fan shape so your knuckles will be out of danger. Hold the head of the wrench with your other hand.

3. Never use a piece of pipe or other similar device as an extension on a wrench.

4. Do not use a shim to make a wrong-sized spanner fit a nut.

Chapter XIV

TOOLS

(Power Tools)

Electric Hand Tools

1. See that the cord insulation is sound and that the terminal connections are solid. Check the plug and the switch, and the motor must be in good shape with brushes which do not spark.

2. Do not overload the motor by overstraining the tool, nor use it on a circuit which is overfused, which may cause a short circuit.

3. Do not use a portable electric tool near flammable gases or vapours.

4. Be sure the tool frame is grounded by means of polarized plugs and receptacles or a third wire and clamp.

Flexible Shaft Tools

1. Check the name plate on the motor to be sure that it can be used with the power available. When using abrasive wheels, see that they are the proper ones for the rated speed and motor capacity. Test your equipment before using it. Pull out the cord plug before you adjust or change the tools.

2. Wear goggles of the cup type or those equipped with side shields. Close-fitting clothing should be worn.

3. Take a firm grip on the tool and shaft. Do not drape the shaft over your body nor straddle it. The shaft must not be used as a tow-rope to move the motor stand. Do not put kinks or sharp bends in the shaft.

Grinding Wheels

(Mounting on Spindles)

1. Make the "ring" test and examine the wheel for defects. Wipe off the wheel's bearing surfaces, flanges, and spindle so that the clamping pressure will be equally distributed.

2. See that the wheel bushing hole is the correct size for the spindle. Use recessed flanges which are large enough to hold the wheel near its outer edge. The compression washers used must be as large as the flanges. Rubber washers should be $\frac{1}{8}$ " thick, or blotting paper $\frac{1}{40}$ " thick.

3. Check the speed shown on the motor plate against the rated wheel speed.

4. Do not tighten the spindle end nuts excessively—just enough to hold the wheel from moving out of place between the flanges.

5. Check up to see that the wheel runs true and free before applying the power. Stand to one side when the power is first turned on.

(Dressing)

1. When dressing a grinding wheel, use a face shield as well as goggles to protect you against large fragments. Use an approved dressing tool—not a lathe cutting tool. See that the star dresser, if used, has a tight shaft and discs in good condition.

2. The edges of the wheel should be rounded off with a hand stone both before and after dressing to prevent the edges from chipping.

3. Place the dressing tool on the work rest, and use a tool holder. Apply the pressure evenly and slowly. Apply diamond dressers at or below the center of the stone.

(Handling)

Unpack new wheels promptly and give them the "ring" test. This is done by suspending the wheel and tapping it with a wooden screw driver handle or a wooden mallet for larger wheels. If undamaged, the wheel will give a clear metallic sound.

(Storage)

Straight or tapered On edge in racks from which they cannot fall.

Thin organic bonded Lay flat on a flat surface.

Cylinder and large cup Stack on flat sides with corrugated paper between.

Small cup or odd-shaped.... In boxes, bins, drawers.

Large wheels In original containers.

Pneumatic Hand Tools

1. Wear face and foot protection. Screen the work from passers-by. Use only safe equipment.

2. Keep the air valve closed until the gun is actually ready for use. Grasp the handle firmly while operating it. Use both hands, but do not lean your body against it. If it sticks, loosen it by rocking it back and forth.

3. When using the gun on a trench sidewall, stand so that it will not hit you if it slips.

4. When laying it down, place it so that it can do no harm if the trigger is tripped. Do not leave the gun standing up when not in use. If the air hose becomes detached, shut off the air at the control valve—do not kink the hose.

5. When finished, close the air valve and clear the hose of air.

Power Hammers

(Digging in Concrete or Hard Ground)

1. See that the hammer and accessories are in good condition. If electricity is used for power, check the extension cord; if air is used, check the valves and connections and see that the trigger is in a safe position when laying down the tool. Wear goggles and protect passers-by if necessary.

2. Determine, from blue-prints if possible, what is under the surface to be cut. Avoid electric, gas and water mains, etc.

3. Do not point the hammer at anyone. Turn the air off at the base control valve when disconnecting it.

Chapter XV

MAINTENANCE AND REPAIR

(General)

1. Inspect all tackle and gear taken from stores, giving special attention to beam clamps, slings, chain and rope falls.
2. Ascertain the approximate weight of a load before lifting it. Do not take a chance that the tackle is strong enough.
3. Before starting work on any machine, place a "Danger" or similar sign on the starting mechanism and be sure to remove it as soon as you have completed the job. See to it that everyone is well clear before starting the machine again.
4. After machine repairs, mechanics must immediately replace guards.
5. When working overhead, be sure that a sign is placed to warn those passing underneath.
6. Always wear goggles when using air driven tools, such as chippers, drills, jack-hammers, rivetting hammers, etc., or when there is danger of dust or foreign bodies injuring the eyes.
7. Oilers should use goggles when using compressed air to clean bearings.
8. Don't use machinery, tools or materials which are not in proper condition for your safety. Unsafe tools are dangerous to yourself and your fellow-workers.
9. Always use a respirator when operating a spray gun, when blowing off dust or mixing paint.
10. Don't carry tools in your hands when ascending or descending a ladder. Use a line with a bucket on the end of it.
11. When you have finished a job, see that you leave things in a neat and orderly fashion. Pick up and dispose of all unused material and rubbish. Pull out any nails in lumber you are removing. Clean up any oil or grease that may be spilt.

12. When welding is being done, both the welder and his helper must wear goggles. Where possible, a safety screen should be so placed that it will screen the arc from those passing by. When welding copper or brass, use electric fan to blow fumes away from welder.

13. When using wire or manila rope slings, pad any sharp edges of the object being lifted so that the sling will not be cut.

14. Before testing any pressure vessel or pipe make sure there is some means of releasing the air in the vessel before the pressure is applied.

15. If it is necessary in case of emergency to tighten up leaking steam joints and there is danger of having your hands burned or scalded, provide yourself with a pair of asbestos mitts before starting on the job.

16. Before working on any pipe line, blank off the line and tag all valves opening into it.

17. Be sure to replace all guards, sewer or manhole covers, etc., when you have finished your work or have to leave it unfinished.

Spray Painting

1. Respiratory protection should be worn while spray painting.

2. The pressure of the gun should be adjusted so that the mist is not excessive.

3. The hands and face should be washed carefully before eating and at the end of the day.

PIPING

Replacing Broken Boiler Gauge Glasses

1. Take out all broken pieces. Blow out any fragments by opening the valves carefully with your face turned away.

2. See that the drain is open and line up the connections. Insert glass of the proper length but do not set it up too tightly.

3. Before testing replace the gauge glass guard or use a face shield. Crack the top valve to warm the glass by permitting the passage of some steam. Then close the drain cock and open the bottom valve a little.

4. When the water level seems steady, open the bottom valve wide, and then the top valve.

Opening Flanged Acid and Caustic Pipe Line Joints

1. Goggles and rubber gloves must be worn. First shut off, and tag if necessary, all valves controlling the contents of the pipe and drain it.
2. Place a rubber or sheet-lead shield over the flanges and keep your face above the pipe level. Remove two lower bolts first, then loosen the others until the residue drips out.
3. If the flanges are stuck together, separate them by driving a sharpened spike through the shield into the joint.

Blanking off Gas or Liquid Pipe Lines

1. To be sure that the line will be closed, use a blank with a diameter larger than that of the outside diameter at the flanges. The blank must have holes in it corresponding to those in the flanges, and must be non-corrosive and heavy enough to stand up under any expected pressure.
2. Bottom outlet lines should be disconnected or blanked off to prevent gases or liquids backing up through them.

WELDING

(Babbitting)

1. Wear a face shield and close-fitting clothing.
2. Preheat the babbitt, melting pot, ladle, and the mold or machine part to be repaired to remove moisture. Inspect all babbitt pig blow holes for moisture.
3. Put the ladle into the lead pot edgewise to avoid splashing. Do not inhale the fumes from the melting pot or ladle.
4. Keep the floor clear to avoid tripping or stumbling with the molten metal, and do not let anything distract you while handling melted babbitt.

(Soldering)

1. Wear goggles or face shield and gloves.
2. Keep sleeves rolled down, shirt collar buttoned, and trouser legs over the shoe tops.

3. Melt solder only in a thoroughly dry pot or ladle secured so it cannot be upset.

4. Never put chilled solder or a moist object into a hot solder pot or ladle.

5. Place hot irons on racks or holders away from all combustible materials.

6. Turn off the current before you leave electric soldering irons. Keep the wire and connections in good condition.

7. Do not test the temperature of an iron by holding it near your face.

8. Do not snap or throw solder to get it off a hot iron.

9. Make sure all explosive vapours have been removed from containers you are going to work on.

(Oxy-Acetylene and Electric Arc)

(General Rules)

1. Do not use welding or cutting flame where an open flame of any kind would be dangerous, as near rooms containing flammable vapours or liquids, lint dust or loose combustible stock.

2. When welding or cutting work must be done on an automatic sprinkler system or where sprinklers are cut off, extra precaution must be used and the proper authority notified.

3. Where welding or cutting has to be done in the vicinity of combustible material, special precautions should be taken to make certain that sparks or hot slag do not reach combustible material and thus start a fire. Sweep floors clean and wet them down before starting work. Wooden floors should preferably be covered with metal or other suitable non-combustible material where sparks or hot metal are likely to fall. Use sheet metal guards and asbestos curtains where needed. Make sure that the guards and curtains are adequate. Because hot slag may roll along the floor for considerable distances, it is important when using asbestos blankets as curtains that no openings exist where the curtain meets the floor. Avoid the use of tarpaulins, as experience has shown that they do not provide adequate protection. It is advisable to carry as regular equipment a fire extinguisher approved for the type of fire that may be encountered.

4. Clean out containers which have had inflammable liquids or gases in them with a steam jet or hot water and a strong caustic soda solution. If possible fill the container with water to within a few inches of the point where welding or cutting is to be done. Allow a vent for the escape of heated air.

5. Do not cut material in such a position as will permit the severed section to fall on the legs or feet. Protect the legs, feet and cylinders from sparks and hot slag.

6. Never attempt to preheat or weld jacketed vessels, tanks or containers or other hollow parts until after every precaution has been taken to vent the confined air sufficiently. A metal part which is suspiciously light is hollow inside and an opening should be drilled before heating. Otherwise it will act like a bomb.

7. Never lay work that is to be heated or welded on a concrete floor because when sufficiently heated a portion of the concrete may spall and fly with possible injury to the operator.

8. Welding operations involving aluminum fluxes, brass, bronze, zinc, or galvanized metals should be done only in well-ventilated areas.

9. Welding operations involving cadmium, lead or materials coated with lead or lead paint require the use of an air-supplied mask or respirator for complete protection.

10. Residue or sludge in containers to be welded should be removed if the welding operation is liable to generate toxic fumes from the contact of the welding flame with such residue or sludge.

(Oxy-Acetylene)

1. Never use oxygen to ventilate a confined space. In an oxygen-enriched atmosphere, clothing or other combustible material will ignite readily and burn fiercely.

2. Keep oxygen fittings and cylinders away from grease. If handling them with gloves, wear gloves completely free from oil and grease.

3. Do not use oxygen as a substitute for compressed air for pneumatic tools, nor for clearing clogged oil lines.

4. Never, under any circumstances, attempt to transfer acetylene from one cylinder to another nor to refill an acetylene cylinder, nor to mix any other gas with acetylene in the cylinder.

5. Make all connections between cylinders, apparatus, hose and piping gas-tight. Use only hose made especially for welding or cutting—do not use metal-covered hose. Use only standard hose connections, and do not force them if they do not fit. Do not use white lead, oil, or grease or any other pipe-fitting compound for making joints. Blow tale and dust from a new hose before connecting it.

6. Do not allow sparks, molten metal or slag to fall on cylinders, apparatus or hose.

7. Always wear suitable goggles when working with a lighted torch.

(Electric Arc)

1. Wear clothing (preferably woollen)which will protect all of your body from the rays of the arc and from hot metal sparks.

2. Wear shoes that extend above ankles or spats and trousers extending below tops of shoes. Turn trouser cuffs up on inside and sew.

3. See that sufficient ventilation is provided, or wear airline respirator when welding in confined places.

4. Be sure your hood is in place before striking an arc, and at all time while welding. Wear hardened filter lens goggles under hood or shield.

5. Keep shields in place to protect others from the rays of the arc. Warn them to avoid looking at the arc.

6. If persons working nearby are unprotected by the shield, advise them to wear protective goggles.

7. Keep fire extinguisher on hand on all welding jobs.

8. Use non-combustible material to support your work.

9. Avoid tangled cables. Where possible keep welding cables on overhead brackets.

10. Put rods stubs in a container; if thrown on the floor they are a slipping hazard.

Chapter XVI

SPECIFIC HAZARDS AND THEIR CURES

HANDLING DOG TEAMS

Working dogs do not have the sense of loyalty generally associated with pets. It is wise to treat them as a potential hazard at all times.

(Safety Rules)

The following rules will help avoid serious incidents:

1. When not working, dogs should be securely tied, far enough apart, to ensure they cannot reach each other and fight.

2. When hitching dogs, be sure to have toboggan or sled securely tied by the "Gee Line" to avoid runaways and fights.

3. Hitch the most vicious or quarrelsome of the dogs into harness first and place him in the "wheel" position (next to the load). Here he will have less opportunity to start a fight and can be supervised by the driver.

4. Dog fights are serious and dangerous.

When separating fighting dogs: (a) do not jump into the middle of the mellee. (b) do not grab a dog by the tail, (c) do not let a dog get behind you.

An accepted method of breaking the hold of one dog is to grab him by the back of the neck with one hand and with the other close off the nostril by squeezing the upper jaw. With a large number of dogs fighting, it may be necessary to use a cudgel. They will suffer less harm from the stick than from the fight.

5. Do not walk closely in front of a dog team. (Particularly if you are alone). Should you fall it might be fatal.

6. Stand well clear of an approaching dog team.
7. When feeding, place pans or dishes at the furthest extremity of the dog's leash.
8. Avoid being tangled in the "Gee Line" or "harness" when hitching dogs.
9. Do not beat or tease dogs.
10. Have dogs inoculated for rabies.

(Care of Exposed Persons)

When a person is known to have been bitten or scratched by an animal that may be affected with rabies a physician should be called promptly. In districts where one is not available or where there must necessarily be a lag of time in obtaining his services, the bite or scratch should receive prompt attention. A superficial wound should be washed with soap and water (preferably 20% soft soap) for 15-20 minutes, changing the fluid frequently. Following this, Tincture of Iodine should be applied. Deep and mutilated wounds should be similarly treated with the exception that some means should be used, such as a syringe, to force the fluid down into the depth of the wound. After this has been done repeatedly and as much fluid as possible removed, Tincture of Iodine should be forced in, in a manner which will ensure it reaching the depth of the wound.

When a physician becomes available he will determine other steps necessary, such as the use of anti-rabies vaccine.

ELECTRICAL EQUIPMENT

(Guarding Live Parts)

Accidental contact with exposed live parts of electrical equipment operating at 50 volts or more should be prevented by enclosing or locating the equipment as follows:

- (a) In a locked room or enclosure accessible only to qualified persons.
- (b) On a suitable balcony, gallery or platform so arranged and elevated as to exclude unqualified persons.
- (c) Elevated 8 feet or more above the floor.
- (d) So that the equipment will be protected by a guard rail, posted with danger signs, if operating at 600 volts or less.

(Grounding)

The exposed, non-current-carrying parts (frames of generators and switchboards, transformer cases, lightning arrestors, switchboxes, operating levers etc.,) of all electrical supply equipment operated at more than 150 volts to ground and of all such equipment in hazardous or damp places regardless of voltage, should be permanently grounded or isolated. It is recommended that exposed, non-current-carrying parts of electric apparatus operating at 150 volts or less to ground also be permanently grounded. Metallic guards (including rails, screens etc.,) about electric supply equipment should be permanently grounded.

Ground connections should preferably be made to available, metallic, underground water-piping systems between which no appreciable difference of potential normally exists—providing the pipe is of sufficient size. If appreciable differences of potential exist between systems, the ground connection should be made to one system only. The use of gas piping systems for grounding should be avoided where possible.

(Safeguards against shock)

When necessary for safety, electrical equipment should be suitably labeled for identification. The label should specify voltage and intended use.

In making electric repairs, six precautions have been recommended:

- (1) Before working on electric circuits pull and lock the line switch in the "off" position.
- (2) Use only non-metallic ladders to reach overhead electric lines.
- (3) Check terminals with a meter or lamp tester to make certain that the circuit is dead.
- (4) Insure good ground connections by "jumpering" where pipe coupling may be faulty.
- (5) Short dead wires as a safeguard.
- (6) The same person who locked out should unlock and restore the line to use.

In changing light bulbs, the power should be shut off. This is important in moist areas, or when the work is done from a ladder, where even a slight shock might cause loss of balance and a serious fall. Bulbs less than 8 feet above the floor level should be guarded and where necessary globes should be both vaporproof and waterproof.

(Fuses)

Removing and replacing fuses in motor and lighting circuits involves danger of electric shock and of arc flashes. Ordinary circuit of 110 to 220 volts may cause fatal shock or, flashes may cause serious injuries. These dangers can be avoided by pulling the switch to "kill" or de-energize the circuit whenever possible.

When the power supply cannot be cut off because of other circuits connected to the same switch, the workmen should stand on something offering insulation from the ground and keep one hand in his pocket so as to avoid touching a grounded object as the fuse is removed with insulated fuse-pullers.

The supply end of the fuse should be pulled first and when the replacement is made the supply end should be inserted last.

As an extra precaution, the workman concerned with changing fuses should turn his face aside during the operation so as to avoid a possible flash. The ideal measure to be taken in such a situation is to insist that he wears eye protection.

A substitute for a fuse of proper capacity should never be used. Replacement usually should be of the same capacity as the one removed.

(Extension Cords and Portable Electric Tools)

The general rules concerning extension cords and portable electric tools must be adhered to at all times to assure safety.

(1) Plugs with cracked shells, bent or loose prongs and screws should be replaced.

(2) Patching a frayed or torn cord or splicing for length is to be avoided if a new one can be had.

(3) Exposure of a cord to abuse of aisle traffic can be dangerous; suspend it or protect it with boards.

(4) Exposure to nails or sharp corners may tear the covering and cause shorts; plan the best possible layout of wiring so that such dangers are prevented.

(5) Cords must at all times be kept away from water, oil, solvents, etc., and away from flames and intense heat.

(6) In the use of electrical hand tools, only equipment that is in good condition should be handled.

(7) Equipment must be properly grounded.

(8) The following unsafe conditions should be reported:

- (a) defective or broken insulation on the cord.
- (b) improper or poorly made connections to terminals.
- (c) broken or otherwise defective plugs.
- (d) loose or broken switches.
- (e) sparking brushes.

(Storage Batteries)

Rooms or enclosures containing stationary installations of storage batteries should be ventilated to remove acid spray and to prevent dangerous accumulation of explosive gases.

Smoking, or the use of open flames, or of tools which may produce sparks should be avoided in the area, except when cells are not actively gassing and when prior ventilation has been ample.

ELEVATORS

1. The elevator must not be overloaded. Find out its safe capacity if it is not marked in the cab.

2. Before starting the elevator, be sure that all gates or doors are closed and latched and that there is nothing which projects into the shaftway.

3. Face the front of the cab while operating or riding in an elevator.

4. Do not attempt to reverse the motion of an elevator without first bringing it to a full stop, as it places too great a strain on the mechanism.

5. Ring the warning bell, then wait a few seconds before moving the elevator from another floor.

6. Stop the elevator cab flush with the floor.

7. If it is necessary to remove or fold back the cover of the elevator cab in order to handle long materials, the cover must be replaced when the job is finished.

8. When stopping the cab at a floor for loading or unloading of materials, the operating control must be locked while this work is in progress.

9. Do not jump on or off moving elevators.

10. Do not insert your head into the shaftway for the purpose of locating the cab.

11. Close the elevator gates when you are through using it.

12. Do not lift the gate when the elevator is not at your floor.

FOUNDRY

1. Wear congress shoes with safety toe caps.

2. When handling molten metal, goggles should be worn.

3. When grinding, chipping or cutting, goggles should be worn.

4. In catching iron, cut the stream towards the furnace or cupola. To cut the stream away from the furnace or cupola is always dangerous and results in many serious burns to the feet and legs. Be alert for run-outs. Stand as far away from the molds as practicable.

5. In pouring iron into moulds, don't have feet too near the moulds.

6. Don't fill ladles too full as the metal is likely to spill and cause serious injury. In handling ladles, carry the bowl behind you, not in front.

7. In handling pieces of metal, leather gloves, or some other form of leather hand protection must be worn.

8. Keep storage piles and bins in good order and pile material properly.

9. Pick up all nails, scrap metal, etc., that you see on the foundry floor, and remove all objects not in actual use which might cause tripping.

10. When men are working in the cupola, a circular screen should be suspended over their heads, and a sign placed on the charging doors.

11. Make sure that your ladle is dry and that the clay lining is not broken.

12. When passing other carriers pass on the bowl side.

13. If your ladle shows a white-hot spot, indicating that it might burn through, set it down and stand clear until someone brings you another ladle into which the metal may be poured. Warn other carriers if you see such a condition in their ladles.

GARAGE MECHANICS

1. Never depend on jacks or chain hoists alone to support a car you have to work under. Block it.

2. Use only electric extension lamps and portable electric tools with cords and fittings that are in good condition.

3. Be sure your feet are clear of passing automobiles or moving machinery when you get under a car.

4. Guard against carbon monoxide gas from the exhausts of running engines. See that there is proper ventilation.

5. Do not have gasoline standing around in open containers. Use kerosene or other relatively safe preparations to clean parts whenever possible.

6. Use safety grip (thumb not around handle) when necessary to crank engines by hand.

7. Don't attempt to lift anything too heavy for you. Get help or use a hoist.

8. Watch the wrenches and other tools you use. Keep them in safe working condition.

9. Keep a pair of safety goggles handy and wear them when doing work in which eye protection is needed.

10. Keep aisles and open spaces on floor free of tools and parts.

11. Be on your guard against flashes or explosions of gasoline vapors, anti-freeze solution vapors and hydrogen from storage batteries. Keep flames and sparks away.

12. If your clothes become soaked with oil or gasoline, change them. Don't take the risk of catching on fire.

13. Never consider a job complete until you have checked to make sure all the lock washers and cotter pins are in place.

14. Never allow grease and oil to remain on floor where you and others might slip on it and fall.

15. Always keep a suitable fire extinguisher near at hand and ready for use.

LABORATORY

1. When possible, carbon tetrachloride should be used for extraction tests.

2. Ether should be stored in a cool place and kept away from air and light.

3. Ether to be used for such tests should be tested for peroxide. When peroxide is found, the ether should be discarded and a fresh supply obtained.

4. A steam-coil-heated water bath should be used as a heating agent for such tests in preference to an electric hot plate.

5. Regardless of the type of heater used, the only safe way is to do the whole of such tests behind a safety glass shield.

6. Clean up all broken glass immediately.

7. Do not use beakers for drinking purposes.

8. When pouring strong acids or alkalis, keep your head turned away from the vessels you are using.

9. Keep all bottles labelled.

10. Painting the gas, water and air lines distinctive colours helps to prevent mistakes when connecting to apparatus.

11. For flushing chemical burns, keep plenty of water handy—at least a bucket full if there is no safety shower.

12. Keep waste in refuse crocks or jars. Remove daily.

13. Watch ventilation. Keep hazardous gases and vapours confined to the hoods.

14. Fire-polish glass tubes.

15. Protect your hands with rubber gloves.

16. Always use a suction bottle to fill pipettes and start siphons.

17. Stand to one side when opening doors of ovens containing explosives or highly flammable materials.

18. Keep a screen of strong fine wire mesh or wired glass between you and apparatus in which there is any chance of a serious flash or explosion.

19. Keep a good pair of goggles or a face shield on hand and use them.

LINEMEN

1. See that safety-belt snap is properly in place and test weight against belt before releasing hand-hold.

2. When attaching safety-belt, see that it is in such a position that it cannot slip off pole or tower.

3. When erecting or removing poles in dangerous locations, two guy-ropes must be attached to the top of the pole in addition to the usual braces.

4. Do not lay tools or line material on cross arms, tops of transformers, or hang them from conductors.

5. Do not ask for material to be thrown up to you—use a hand line.

6. Do not stand directly under towers, poles, or structures on which work is being done.

7. When climbing poles, climb on the same side as the ground wire of the pole, so that the hands will not have to touch it.

8. When climbing a pole on which there is more than one circuit, make sure which are alive and which are dead, and take precautions accordingly.

9. All conductors must be grounded.

10. When buzzing insulators, test with one prong of the buzz-stick before circuiting units. Work from a position lower than the conductors when using a buzz-stick.

11. When spare material is left on towers or poles, make sure that it is well secured in place.

12. Never climb a pole to cut guy wires or other wires if there is any danger of it falling after the wires are cut.

MACHINE SHOPS

1. Step pulley belts should be shifted by means of a belt pole or other suitable stick.

2. Use a brush to remove chips from your machine—never your hands.

3. Gloves must not be worn while operating any machine tool.

4. Only employees so authorized may operate any of the equipment in the machine shop.

(Drill Press)

1. Use drills properly sharpened to cut to the right size, and do not force it nor feed it too fast, as broken or splintered drills and serious personal injuries may result.

2. Never attempt to hold the work under the drill by hand—clamp it securely to the table before starting the machine. If it slips from the clamp, stop the machine and reset it.

3. Do not leave the chuck wrench in the chuck.

4. Always stop the drill if you leave the machine.

5. File or scrape all burrs from the drill hole—do not use your hands.

(Lathe)

1. See that the tail stock, tool holder, and the work are all properly clamped before turning on the power.

2. Do not attempt to adjust a tool or feel the cutting edge while the lathe is running.

3. Never apply a wrench to revolving work or parts.

4. When filing close to the chuck or the dog, file left-handed. Do not use a file with an unprotected tongue—get a handle for it.

5. When putting chucks or face plates on lathes, or when removing them, use hand power only—never the power which drives the machine.

6. Eye protection should be worn while the lathe is in operation.

(Planer)

1. See that tools and materials are tightly clamped. When loosening tool holders, hold the tool with one hand or place a support under it.

2. Have planer idle when adjusting length of bed stroke. Never ride the bed.

3. Do not leave tools, chips, or scraps of stock under the bed.

4. Eye protection should be worn while the planer is in operation.

(Milling Machine)

1. Make sure that the cutter and arbour are secure, and that the work is clamped firmly.

2. Check speeds and feeds.

(Hammers)

1. Do not operate the hammer while the dies are cold. Insert a hot bar and close the dies temporarily to remove the chill. Adjust scale guards.

2. When changing dies or making repairs or adjustments, place a prop under the hammer, be sure that the operating valve is closed tightly, and block the treadle.

3. When a steam hammer is not in use, leave the ram resting at the bottom of the stroke. On a board hammer, block up the ram.

4. Never put your head or hands between the dies unless they are blocked up, the power is locked in the off position, and a warning tag attached to the starting mechanism.

5. Do not use short swabs, and keep tools and materials away from treadles and flywheels.

6. Do not throw belts from hammers while power is on.

7. Avoid stepping on hot flashings.

8. Use tongs to handle pieces in and out of the dies, unless the hammer is blocked up.

OFFICE SAFETY

(Tripping, Slipping and Falling)

1. All floor areas, including storage space, should be well lighted.

2. Floors should be kept clean, dry, and free from obstructions of any kind.

3. Linoleum and other polished floor surfaces should be treated with a slip resistant preparation.

4. Rough or splintered floors should be treated with a suitable floor preparation or covered with a protective material. Torn or damaged floor covering should be removed or properly repaired.

5. Building entrances surfaced with smooth flooring may become slippery during stormy weather, and should be provided with suitable storm mats made of fluted rubber, untreated leather links, etc.

6. All stairways should be equipped with anti-slip treads and suitable hand rails, and should be kept clean and dry.

7. Differences of floor elevation in aisles, corridors and other walkways should be clearly indicated, and where necessary, proper railings provided.

8. Power and telephone outlets, wires, or extension cords should not be permitted in any location where they will cause a tripping hazard.

9. Ladders or stands provided with non-slip treads and feet should be available for personnel, when high files or other high equipment is used.

10. Drawers of desks and file cabinets should be kept closed when not in use. Materials should never be placed on floor where tripping may result.

11. Rugs and carpets should be secured in such a manner as to prevent them from slipping or creeping.

(Equipment)

1. Working space and office equipment should be so arranged that safe and comfortable working conditions are assured.

2. Precautions should be taken to see that floors are adequate to carry loads placed upon them. Special consideration should be given to heavy concentrated loads such as safes, etc.

3. Illumination at all points should be free from glare and ample for the type of work being done. Highly polished desk tops, may cause excessive glare unless covered by desk pads or other nonreflecting materials.

4. When purchasing materials and equipment the safest possible design and all necessary safety devices should be specified in the original order.

5. Windows should be readily accessible, equipped with suitable operating devices, and should open and close easily.

6. The variety of office machines now in common use are generally operated by personnel unfamiliar with mechanical hazards. All belts, gears, pulleys and other rotating or reciprocating parts of office machines should be guarded as completely as possible. Electrical machines should be properly grounded. All necessary repairs should be made by trained mechanics.

7. Sharp burrs sometimes found on metal furniture, equipment, etc., should be removed before use.

8. All washroom fixtures should be maintained in good repair, both for safety and sanitation.

9. If it is necessary to use safety razor blades for various office cutting operations, proper holders should be provided. When not in use blades should be stored in a safe manner.

10. Broken glass should never be placed in wastepaper baskets. If a special container is not provided for its disposal, it should be safely wrapped, carefully marked and safely placed, for disposal by the cleaning force.

11. Through normal wear and tear wooden office furniture frequently becomes chipped or splintered and conditions are created which may cause injury. Equipment in such condition should not be used until it is properly repaired.

12. Pointed objects such as pens, sharp pencils, paper cutters, spike files, etc., should not be carelessly used or stored. The use of unguarded spike files should not be permitted since such pointed objects can and often do cause serious puncture wounds.

13. Protective creams and lotions should be provided whenever possible for personnel using solvents, duplicating inks, etc. Special preparations for harmless removal of mimeograph ink, etc., from the hands should be provided.

(Collisions and Obstructions)

1. Two-way traffic around blind corners should be separated by lines painted on the floor, or if necessary by railings.

2. Employees have been injured by walking into closed, transparent, unlettered glass doors. Such doors should have a clearly visible identifying mark in the center of the glass panel approximately $4\frac{1}{2}$ feet above the floor. Solid swinging doors should have clear glass observation panels. Partly open doors are dangerous, doors should be kept either wide open or closed.

3. Electric fans should be installed at points where employees are not likely to come in contact with them. They should be securely anchored, properly guarded, and maintained in good operating condition.

4. Any protruding object or projection constitutes a hazard that should be eliminated, properly guarded, or clearly marked. Illustrations of this category are:

- (a) Pencil sharpeners projecting beyond edge of table or desk.
- (b) Drawers or doors left open when not in use.

(Falling Objects)

1. File cabinets may overturn when the top drawers are open, especially if they are overloaded and the lower drawers are empty or filled with lightweight material. Where possible groups of files should be securely fastened together or weights may be placed under the bottom file drawer in the case of individual files.

2. The placing of card index files or other heavy objects on top of file cabinets or other high equipment should be discouraged.

3. Ceiling fixtures, fans, etc., should be carefully inspected immediately after installation and when repaired or replaced.

4. Ceilings should be checked often for defects which may cause material to fall. Such defects should be remedied immediately.

5. The pulleys, cords, etc., on venetian blinds and the operating mechanism of other window coverings should be regularly inspected and kept in good repair.

6. Movable objects such as flower pots, boxes, vases, should not be permitted on window sills or ledges.

(Fire)

1. Good housekeeping should be required at all times.

2. Do not permit loose paper to accumulate on the floor or in or on equipment.

3. Matches should not be left loose or exposed. Only safety matches should be used.

4. The indiscriminate disposal of cigarettes and cigar butts and burnt matches, in wastebaskets, etc., should not be permitted. Ash trays should be provided for this purpose.

5. Wastepaper baskets should be made of non-combustible material.

6. Flammable liquids and similar material should be stored in safe containers, preferably in locked cabinets. Only minimum quantities should be kept in the office and bulk storage should be in properly constructed fire-proof vaults.

7. Nitrate film should never be stored in office space unless proper vaults or cabinets are provided for this purpose, and then only in amounts recommended by the National Board of Fire Underwriters.

8. Oily rags should be placed in closed, fireproof containers. They should never be stored with other flammable material.

9. Open gas heaters, if required, should have metal connections to gas lines and be properly vented to insure safe disposition of products of combustion.

10. Fire escapes should be adequate and fire instruction and drills held at necessary intervals.

11. The proper type of fire extinguishers should be provided.

12. All electrical equipment, connections, cords and wires should be inspected regularly. Any defects found should be repaired immediately by competent electricians.

13. The use of portable electric hot-plates should be discouraged. If their use is necessary they should be used on a fire-proof base and all electric connections and cords kept in safe condition.

14. Conditions existing in the vicinity of occupied space, either in the same or adjacent buildings or areas should be evaluated as sources of danger to employees. These may consist of fire or explosion hazards, unpleasant or noxious fumes, or unsanitary conditions. Every effort should be made to abate such conditions.

BRUSH PAINTING

1. When brush painting indoors, keep windows and doors open to dissipate vapors.

2. When working with lead paint, keep hands away from your mouth; keep fingernails short and clean. Wash carefully before handling food or tobacco.

3. Wear substantial work clothing, including a cap. Have work clothes washed frequently. Keep them separate from street clothes.

4. Wash thoroughly and change clothes before going home. Bathe daily and wash the hair often.

5. Eat a good breakfast and drink milk several times a day. Eat lunch in a clean sanitary place away from the place being painted.

6. Do not wash hands with gasoline, thinners or other drying solvents. Use of a protective cream before starting work will help the washing up job later.

SPRAY PAINTING

(Hazards)

The inherent hazards of spray painting are of two general types:

(a) Fire and explosion hazards due to the presence of finely divided flammable mist suspended in the air.

(b) Health hazards due to inhalation of spray containing toxic vapors or toxic finely divided particulate matter.

(Precautions)

1. Spray painting within buildings should be conducted in segregated rooms or enclosures equipped with suitable exhaust systems.

2. Exhaust systems should be so arranged that the fan motors are outside the ducts, hoods and booths.

3. At the finish of spraying operations, exhaust systems should be continued in operation until all flammable or toxic vapors have been removed.

4. Good housekeeping is essential.

5. Goggles, gloves, aprons and respirators should be worn by the operator. Cotton may be used to protect the ears.

PESTICIDES

Today chemicals for pest control are widely used in agriculture, industry, public health and the home. Not always recognized as important causes of poisoning pesticide preparations are being used in about 80,000 formulations with over 200 basic chemicals.

The degree of risk involved in the usual or customary use of pesticides depends on a variety of factors other than the intrinsic toxicity of the chemical. The form (liquid, gas) and formulation (oil solution, wettable powder) of the product; its method of application (mist or coarse spray); frequency, amount and duration of exposure; and other circumstances of use all influence the degree of risk.

Poisoning may occur both from single exposures to appreciable amounts of pesticide agent and from frequent, successive exposures to small quantities. The use of preparations containing solvents and wettable agents in the formulation or of finely dispersed preparations and the presence of oil or grease on the skin facilitates absorption of the toxic products into the body.

Application under confined conditions such as in an unventilated room or lack of suitable protective equipment when the preparation is handled for prolonged periods or is in concentrated form also reduce the safety with which pesticides may be employed.

(Comparison of Safety of Pesticides)

<i>Low risk</i>	<i>Moderate risk</i>	<i>High risk</i>
	<i>Insecticides</i>	
allethrin	aldrin	demeton (Systox)
derris	BHC	hydrogen cyanide
methoxychlor	calcium arsenate	Metacide
p-dichlorobenzene	Chlordane	methyl bromide
Perthane	chlorothion	nicotine
propellant (freon)	DDT	parathion
Pyrethrum	diazinon	paris green
synergists	dieldrin	schradan (OMPA)
	diptherex	TEPP
	endrin	
	lead arsenate	
	Lethanes	
	lindane	
	melathion	
	metaldehyde	
	naphthelene	
	pentachlorophenal	
	silicofluorides (sodium, mercury)	
	sodium fluoride	
	solvents (kerosene and others)	
	Thanite	
	toxaphene	

Rodenticides

Fumarin	alpha-naphthyl-thiourea-	arsenious acid
Pival	(ANTU)	castrix
red quill	barium carbonate	phosphorous (yellow)
Tomarin	zinc phosphide	sodium fluoroacetate
warfarin		strychnine
		thallium

Fungicides

Bordeaux mixture	dichlone	alkyl mercury salts
captan	dichloroethyl ether	mercuric chloride
chloranil	lime-sulphur	phenyl mercury salts
copper carbonate	nabam	
ferbam	pentachlorophenol	
glyodin	thiram	
maneb		
sulfur		
zineb		
ziram		

Herbicides

2, 4-D	fuel oils	dinitro-o-cresol
endothal	sodium borate	sodium arsenate
maleic hydrazide	sodium chlorate	sodium arsenite
monuron, diuron	sodium trichloroacetate	sulphuric acid
(chlorophenyl dimethylureas)		

If you are using pesticides, remember they are poison and kill bugs—and they can poison you too.

1. wear protective clothing, gloves, respirators and eye protection.
2. don't eat or smoke while using pesticides.
3. don't remove clothes, gloves or respirators while working in the hot sun.
4. if your clothing becomes contaminated
 - (a) stop work and leave area.
 - (b) remove clothing.
 - (c) take a shower and wash skin thoroughly.
 - (d) wash clothing.
5. burn or bury all empty containers. Don't stand in the smoke of burning containers. The smoke can poison you.
6. never sleep in a room where poisons are stored.

7. After work:

- (a) remove and wash clothes.
- (b) take a shower using plenty of soap.
- (c) go home in clean clothes.

RADIATION

(General)

1. In working with radioactive sources or x-ray machines it is necessary to ensure that no worker receive more whole body radiation than the maximum permissible dose of 300 milliroentgens per week as recommended by the Department of National Health and Welfare. This and other details on the maximum permissible exposure for different portions of the body and for different types of ionizing radiations may be found in "Summary of the Recommendations of the International Commission on Radiological Protection (1954)" published for distribution in Canada by Radiation Services, Occupational Health Division, Department of National Health and Welfare.

2. The values proposed for maximum permissible doses are such that the risk involved is small compared with the other hazards of life. However, since these values are based on incomplete evidence and there is knowledge that certain radiation effects are irreversible and cumulative, it must be the responsibility of all concerned with radiation work to make every effort to keep exposure to all types of ionizing radiations at the lowest possible level.

(Radiation Monitoring)

1. All accessible areas in the vicinity of radiation-producing sources should be surveyed by, or under the direction of, a qualified expert using suitable instruments and methods for measuring radiation, to determine the maximum levels of radiation to which persons may be exposed.

2. Personal monitoring should be required for each individual for whom there is any reasonable possibility of receiving a weekly dose of all radiations exceeding one-quarter ($\frac{1}{4}$) of the maximum permissible amounts specified by the International Commission on Radiological Protection.

3. Any individual entering a radiation field greater than 100 millirem per hour should wear suitable personnel monitoring equipment.

4. Regularly scheduled monitoring of the air within the installation for radiation or radioactive content should be required when there is any reasonable possibility that the average levels of activity therein may exceed one-quarter ($\frac{1}{4}$) of maximum permissible levels.

5. Records of all measurements and surveys should be maintained and kept available.

(Safety Rules for Laboratories)

1. Visitors not allowed in the radioactive laboratory without specific permission from the director. No person should enter the laboratory unless he has reason to be there.

2. The laboratory must be kept locked at all times when not being used.

3. All persons working in the radioactive laboratory must wear a special lab. coat; such coat to be worn in the radioactive laboratory only. The lab. coats worn in the active laboratory might be a different color from those usually worn in the ordinary laboratories or must be marked in some way.

4. Work with activities of more than a few hours of half-life but less than 1 mc could be done over a tray. However, if it is possible, all work with radioactive isotopes should be done in a fumehood. Work involving spray or fume or gas evolutions, as well as work with activities of more than 1 mc *must* be done in a fumehood.

5. When work is completed, each person will individually clean and/or dispose of contaminated material. Trays and table should also be cleaned.

6. Always use rubber gloves when handling more than a few hundred counts per minute. Wash hands thoroughly and monitor them with a suitable instrument before leaving laboratory.

7. Equipment (including glassware and chemicals) must not be removed from the radioactive laboratory without being thoroughly checked for contamination. Also, equipment must not be removed from the fumehood into any other part of the radioactive laboratory without first being checked for contamination. The danger of widespread contamination makes it inadvisable to bring in or borrow equipment from other laboratories.

8. Small traces of radioactive material are particularly dangerous when ingested. There should, therefore, be NO EATING OR SMOKING where radioactive work is going on.

9. Special care should be taken against visitors becoming contaminated. Visitors to the radioactive laboratory should wear a laboratory coat and shoe coverings and be monitored before they leave.

10. The radioactive laboratory should periodically be monitored at least once a week and be "damp-cleaned" regularly. Floors should be swipe checked daily when laboratory is in use.

11. The monitoring film badge must be worn when working in the radioactive laboratory.

(Warning Signs)

1. All radiation machines should be clearly labeled as follows:

CAUTION—X-RAYS

This equipment produces X-rays when energized.

2. All radioactive material not in process or in possession of the user should be clearly labeled as follows:

- (a) Containers for sealed sources of external hazard only:

CAUTION—RADIATION

(where a time limit is specified, it should be posted.)

- (b) Radioactive material in loose bulk or unsealed containers-internal hazards primarily:

DANGER—RADIOACTIVE MATERIAL

"The material contained herein must not be allowed to enter the body either by inhalation, ingestion, or through wounds in the skin."

3. The standard symbol for designating any radiation hazard shall be:

The standard color specification should be a background of yellow with lettering and distinctive symbol in purple (magenta). The use of this symbol for any other purpose is expressly prohibited. The symbol and lettering should be as large as practical, consistent with size of the equipment or material.

4. All radioactivity containers, storage areas, work areas, or other normally occupied areas where a radiation hazard may exist should be posted with accepted radiation-hazard labels, except where such labels may be a source of disturbance to patients undergoing radiation treatment.

5. Any areas where a radiation hazard may exist on a frequent or infrequent basis, but which are not readily accessible and are so situated as to be occupied only under infrequent and special circumstances, should be posted with accepted radiation-hazard labels.

6. All areas that are readily accessible but not normally occupied, and where a radiation hazard may exist on a frequent or infrequent basis, should be suitably fenced off and posted with the accepted radiation-hazard label.

7. All radiation-hazard labels posted when a radiation hazard existed should be removed when the hazard is no longer present.

SHIPBOARD HAZARDS

Visitors who are not familiar with the hazards involved on board ships may be taking unnecessary chances and endanger their lives. The following rules are a guide but the visitor must never relax his vigilance.

Gangways —locate the gangway in relationship to the cargo hatches.

- due to changing tides and the loading or the unloading of the vessel gangways may be inclined upwards or downwards. Be sure the gangway is securely fastened. Use the handrails.
- Contact a ship officer.

Deck —locate the vertical and horizontal loading cables and booms.

- keep clear of wires, cables, and booms.
- hatch covers may be piled adjacent to side railings. Keep clear, as piles may tip with the movement of the ship or the weight of a person crossing over.
- loose hatch covers create tripping hazards.
- watch out for mooring cables etc. near ladders.

Hatchways—hatch ladders may be bent out of line. Be careful.

- use handrails when climbing. Rungs may be loosened by swinging cargo loads.
- use ladders only when cargo is not being moved.
- if cargo is being moved be sure you have clearance and stay out from beneath loads.
- when in the hold keep under cover.
- when crossing covered hatchways be sure all boards are in place.

General

- when the ships mooring is being moved keep clear of mooring cables etc.
- watch for man-holes with the covers removed.
- check security of rope ladders before using.
- obey warning signs, particularly no smoking in confined areas.
- when entering or leaving cabins, watch for the partition under the door, step over and not on the partition.

SHIPPING ROOM

1. Make sure that the loading plate between the shipping platform and the freight car is firmly fastened in place.

2. When loading cars, or when loading through one car into an adjacent one, the truck must be operated in a forward direction with the load in front of the operator.

3. A car must not be spotted from the loading platform by using an electric truck.

4. Do not use the steel plates which slide in fixed tracks in the floor as scooters.

5. When tightening steel tape around the articles in a car, wear goggles and stand to one side to keep from being slashed should the tape break.

6. Use only substantial knot-free planks for bridging between electric lift trucks and upper tiers. Brace and block the planks to prevent them from falling.

7. Stay in the empty end of the car while the electric truck is moving in, or, if neither end is empty, stand in the other doorway.

8. When pushing a loaded skid into a freight car with a hand lift-truck, raise the truck platform to its full height.

9. Skids must not be left in passageways or in other places where people might trip and fall over them. They must not be leaned against a post or wall.

10. Safety shoes should be worn by employees working in this department.

11. Do not lead cars which are attached to locomotives. Do not ride in freight cars which are being spotted.

12. Hoist trolleys must not be put back onto the power line unless the switch controlling that line is first pulled and tagged.

13. Avoid paper cuts—do not slide your fingers along paper edges when grasping a pile. Get first aid for all paper cuts.

SHORING TRENCHES

1. Use only tools in good condition.

2. Do not work too close to other workers, you may strike them or be struck with their tools.

3. Be careful to remove earth or other materials in such a way as to leave no "overhangs."

4. In hard compact ground, other than running, saturated, filled or unstable material, trenches, more than 4 feet deep should be shored with 2" by 6" planks or heavier placed vertically against the side walls of the trench, opposite each other and at frequent intervals, throughout the length of the trench. Whenever possible, they should extend to the bottom of the trench and should be thoroughly braced either with screw jacks or by timbers placed at right angles to the shoring, cleated and screwed or wedged rigidly.

5. To guard against running material, use sheet piling adequately braced. This should not be less than 2" thick for trenches between 4 feet and 7 feet deep and for trenches more than 7 feet deep, not less than 3" thick.

6. For trenches in filled, unstable or saturated (not running) material, use sufficient sheeting to adequately hold the material in place.

7. Use only lumber that is sound and straight.

8. Do not place excavated material nearer than 18 inches to edge of trench.

9. Keep the shoulders clear of all loose objects that might fall on you or others working in the trench.

10. When removing bracing, always remove the lower braces first, leaving the upper ones until last for your protection.

STEAM PLANT

1. Have a helper with you in case of emergency when starting a boiler.

2. When a bag or blister appears, there must be no delay in carefully examining and repairing it.

3. Open or close valves gently on high-pressure steam lines. Crack the valve from its seat slightly and await pressure equalization, then open it slowly. Use the by-pass if one is provided.

4. Have a helper with you when you clean the boiler drum.

5. Tag all valves and lines leading to the boiler when repairing it, and affix a sign at the point where anyone enters the boiler.

6. Unless specifically authorized to do so, do not start the compressor.

7. Wear goggles and respiratory protection when handling coal or ashes. Goggles must be worn when boiler tubes are being cleaned. Ashmen should wear special shoes when cleaning the boilers. Wear gloves when working on steam lines.

8. Do not open the doors of a boiler in operation unless authorized to do so.

9. Use the tinted eye-protective device when looking at the fire.

10. Blow out each gauge glass and water-column connection at least once each shift.

11. Wear goggles and rubber gloves when working on feedwater treatment lines.

12. Do not look at a gauge glass under pressure while turning it off or on.

13. When draft dampers are being adjusted, do not look at the fire.

14. Wear a safety belt and have a helper with you when going down into the coal bunkers.

15. Be sure that water is showing in the gauge glass before starting, unbanking, or replenishing the fire. Check all valves before starting a fire in the boiler.

16. Touch the spring or lever of the safety valve daily to see that it is not stuck on the seat. Test this valve to see that it blows freely at the pressure allowed on the inspection certificate. Do not increase the setting of a safety valve without authority.

17. Never tighten a nut, bolt, or pipe-thread under pressure, nor strike any object under pressure.

18. With oil fuel, in case of low water, shut off the oil and steam supply at the burner, leaving the atomizing valve open. Where coal is used, cover the fire entirely with ashes, or, if they are not at hand, dump or draw the fires out. Do not turn on the feedwater nor tamper with the safety valve. Let all other steam outlets remain as they were until the boiler has cooled off.

19. Keep gauge cocks clean and try them frequently. See that all connections to water glass and water column are clear. Do not depend upon the water glass; it is convenient but not always reliable.

20. The blowoff valve should be opened wide once a day, or oftener if the water contains much sediment. This action aids in keeping the boiler and blowoff pipes clean. Do not leave the blowoff valve while it is open.

21. Do not close the damper entirely when there is a fire in the furnace, as gas is liable to accumulate in the combustion chamber or tubes and cause an explosion.

22. All boiler connections and appurtenances should be kept in good working order, and the boiler room kept clean and neat.

23. Do not allow scale, mud, or oily matter to settle on the fire sheets, causing the sheets to become burnt, bagged and buckled, or a rupture or explosion may result.

24. Do not attempt to light or relight the fire until the draft doors and dampers are wide open and until all gas has escaped.

25. A main which has been welded should be tested before it is put in service.

26. Provide proper protection, by means of signs, valves closed and tagged, etc., for anyone entering the boiler.

27. Use bypasses wherever they are provided.

STORES

1. Use ladders for access to bins and shelves that are out of ordinary reach.

2. When you have to move heavy objects, get someone to help you or use a chain-fall.

3. Materials must be stored so that aisles are kept clear at all times and so that access to fire extinguishers is not impeded. Materials must not be piled so that sprinkler heads are prevented from working efficiently.

4. Materials should be piled securely so that they cannot come loose or fall due to vibration.

5. When cutting wire or metal strips from bales or packages, wear goggles and stand where the flying ends cannot strike you.

6. When uncrating material and opening barrels, kegs and boxes, remove all projecting nails before starting to unpack them.

7. Wear gloves when handling cases, crates and metal containers, especially strap or wire-bound boxes or crates.

8. Return all tools to their proper places after you are through with them. Pick up and dispose of boards, covers, empty containers, baling wire, strapping, etc. Maintain good housekeeping at all times.

9. Safety shoes should be worn by men working in this department.

10. When storing round objects above the floor, place them so that they cannot roll and fall.

11. Do not overfill bins.

WOODLAND OPERATIONS

(Cutting and Hauling)

Felling

1. Trails to cutting operations must be cleared.
2. In small timber, choppers must not work closer than 100 ft. In large timber, eighty foot in length or over, this distance must be at least 150 ft.
3. When cutting a spring pole it must be cut from the inside.
4. Trees must not be felled toward a steep slope.
5. A warning cry must be given before the tree is felled.
6. When using a pole, in pushing a tree, the butt of the pole must be held against the hip or the shoulder, never against the stomach.
7. When the tree starts to fall, workmen must move away quickly to a distance of not less than 10 ft.
8. It is strictly forbidden to climb a lodged tree for the purpose of dislodging it.

Branching and Bucking

1. When branching, a man must never walk on the bole of the tree.
2. Before starting the saw cut when bucking, the path of the saw must be cleared of all obstructions.

Skidding and Piling

1. While skidding, the skidder must walk on the inside of curves or behind the logs.
2. When skidding across a slope, the skidder must walk on the slope above the log.

Rollways

1. The front of the rollway must be blocked.
2. A standing tree must never be used to brace the front of a rollway.

Hauling

1. When using a jammer, it must be supported by at least two guy ropes.
2. Binder chains must always be used when hauling logs.
3. When necessary to uncouple sleighs on a hill, the sleighs must be blocked.
4. Wood hooks must always be placed with the point downward when hung on the sleigh post.

Truck or Tractor Hauling

1. Men must not go between moving sleighs for coupling.
2. When slings are used to unload sleighs, the men must stand clear of the load before the hoisting signal is given.
3. Men must not ride on the loaded sleighs.

(Main Truck Roads)

1. On main truck roads, all curves, crossings, bridges, etc., must be marked by warning road signs.
2. All bridges must be protected on either side at least by stringers along the length of the flooring.
3. Damaged road surfaces shall be protected by red flags and, or, flares.
4. During the hauling season, all hauling roads which cross a truck road shall be protected by red flags.
5. When telephone wires cross roads, a minimum of 15 feet clearance must be allowed.

(Trucks and Passenger Cars)

1. Both foot brakes and emergency brakes shall be in good working condition.
2. Vehicles must not operate with broken windows.
3. Headlights shall be in good operating condition at all times.

4. A flashlight in good operating condition shall be kept in each truck or car.

5. A vehicle must not be allowed to operate with a leak in the exhaust pipe.

6. Horn must always be in good working order.

7. No one shall ride on running boards or fenders.

8. Workmen must not board or leave any moving truck or car.

(Boats and Canoes)

1. Boats and canoes which are damaged and therefore unsafe, shall not be left where men might use them. They must be repaired, destroyed, or taken away.

2. All gasoline boats with inboard engines shall be provided with at least one fire extinguisher, in good working condition.

3. Boats with outboard motors must be provided with an old blanket, bucket of dry sand or a fire extinguisher.

4. Motor boats must always have sufficient life preservers to allow one for each member of the crew. When transporting men, there must be sufficient life preservers for all on board and, or, a seaworthy boat must be in tow, sufficiently large to take care of all passengers.

5. Boats must never be overloaded. The number of men to be allowed in any boat must conform with the regulations. Total capacity must be indicated clearly in paint on the boat.

6. Men must not smoke or use matches when filling a gasoline tank.

7. Boats shall be lined down dangerous rapids with one rope only.

8. All motor boats shall be equipped with a flashlight in good working order.

9. Paddles or oars shall be available in all motor boats for emergency use.

(Fire Hazards)

1. All camp stoves shall be equipped with a stove pipe key to control the draft.

2. Stove pipes should never be closer than 4' to an unprotected wall. If closer than that, the wall shall be protected with tin but in no case shall any stove pipe be closer than 2 ft.

3. Stove pipe holes in the roof or wall must be sufficiently large to allow at least six inches of clearance all around the pipe. Any beams within one foot shall be protected with tin. In the case of a double roof, a large tin pail or circular piece of tin or sheet iron shall be installed to stop moss from falling against the pipe.

4. A large piece of tin shall be placed in front of and partially under the stove to prevent any live coals falling on the floor.

5. Rubbish must never be allowed to accumulate near the stove and firewood shall be piled at least 12" from the stove.

6. Coal oil must not be used for lighting stoves.

(Tools)

Axes

1. Crooked axe handles shall not be in use.

2. At least one grindstone shall be available in every camp and shall have an axe gauge attached to it.

WOOD WORKING MACHINES

(Saws)

Circular saws should not be operated at speeds in excess of 10,000 peripheral feet per minute unless manufactured for higher speeds. In such cases, the manufacturer should etch upon the saw the speed at which it should operate.

(Circular Rip and Crosscut Table Saws)

Each circular rip saw and crosscut table saw should be guarded by a hood which completely encloses that portion of the saw above the table or at least that portion of the saw above the material being cut. The hood should adjust itself automatically to the thickness of, and remain

in contact with, the material being cut. The guard should be so constructed as to protect the operator from flying splinters and broken saw teeth. It should, also, be provided with a spreader to prevent material from squeezing the saw and a non-kickback device to prevent material being thrown back at the operator.

For short pieces of material being sawed the operator should use a "push-stick".

(Swing Cut-off Saws)

A swing cut-off saw should be equipped with a hood that will completely enclose the upper half of the saw, the arbor end and the point of operation at all positions of the saw. It should be provided with an effective device which will return the saw automatically to the back of the table when the saw is released at any point in its travel.

Limit chains or other equally effective devices should be provided to prevent the saw from swinging too far in either direction.

A latch should be provided to catch and return the saw at the rear of the table to prevent its rebounding.

(Band Saws)

All portions of the blade should be enclosed or guarded except the working side of the blade between the bottom of the guide rolls and the table. The guard for the portion of the blade between the sliding guide and the upper wheel should be self adjusting.

(Boring or Mortising Machines)

Safety bit chucks, with no projecting set screws, should be used. Universal joints on the spindles of boring machines should be completely enclosed.

Each operating treadle should be covered by an inverted U-shaped metal guard fastened to the floor. The guard should be of adequate size to prevent accidental tripping.

(Jointers)

Hand fed planers or jointers with horizontal heads should be equipped with cylindrical cutting heads.

They should be equipped with an automatic adjustable guard which will cover all the section of the head on the working side of the fence or gauge and with a guard which will cover the section of the head back of the fence or gauge.

Each jointer with a vertical head should be equipped with a guard, which may be an exhaust hood so arranged as to completely enclose the revolving head, except for a slot of such width as may be necessary and convenient for the application of the material to be jointed.

Operators should use "push sticks" for short material.

(Sanding Machines)

Each drum sanding machine should be equipped with a guard, which may be the exhaust hood, so arranged as to enclose the revolving drum with the exception of such portion of the drum above the table as may be necessary.

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